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S. N. SIVA SEKHARA SARMA,
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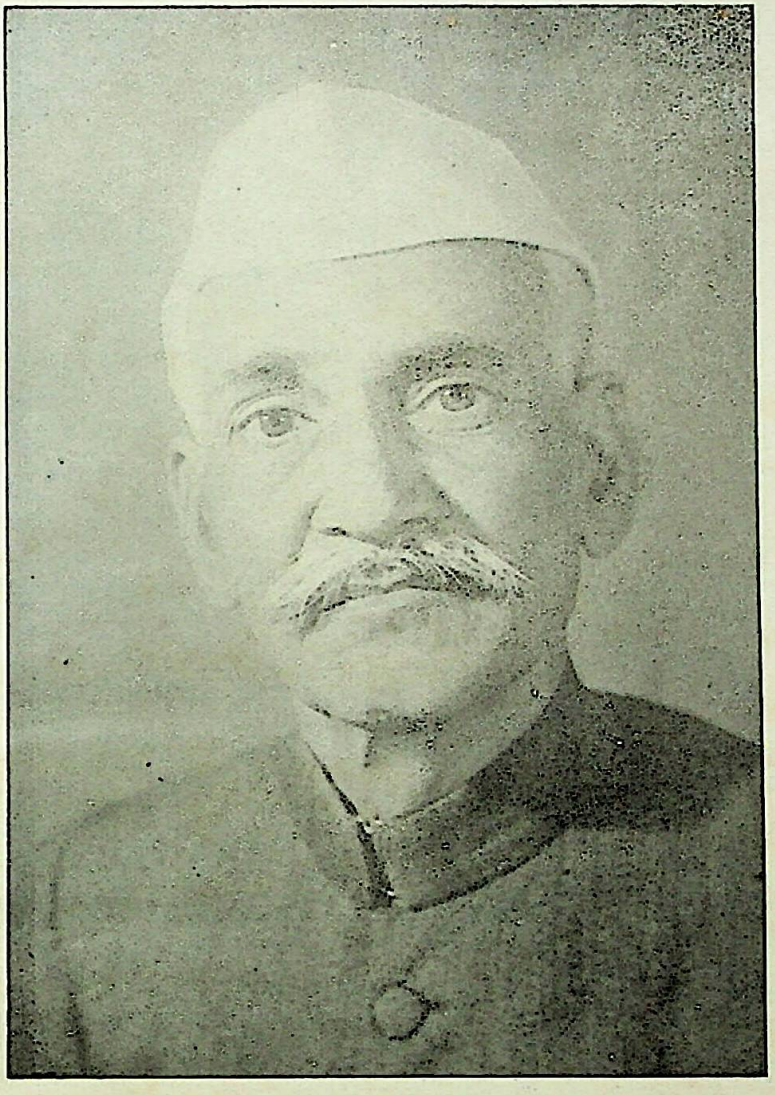
MESSAGE



Universities should not only be seats of learning but should also be centres of authentic culture. The object of culture is to cultivate the mind and develop the personality. The function of the University is not only to transmit traditional learning but also to make contributions to the sum total of our knowledge. Much more than all this, the University should be the centre of new and creative ideas which may protect the community from stagnation and deterioration. Culture is thus a progressive movement which maintains the spiritual health and vitality of the community.

Culture is a plant of slow growth and needs careful nurture. It can flourish only in a free atmosphere where there is a free interchange of ideas and opinions.

From this point of view, every healthy and progressive literary or cultural activity should be encouraged. I welcome the reappearance of the B.H.U. Journal and express the hope that it will maintain a high standard under the able editorship of Dr. R. S. Tripathi.

NARENDRA DEVA

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कुल गीत

मधुर मनोहर अतीव सुन्दर, यह सर्वविद्या की राजधानी।
यह तीन लोकों से न्यारी काशी।
सुज्ञान धर्म और सत्यराशी॥
बसी है गङ्गा के रम्य तट पर, यह सर्वविद्या की राजधानी।
मधुर०—॥

नये नहीं हैं यह ईंट पत्थर।
है विश्वकर्मा का कार्य सुन्दर॥
रचे हैं विद्या के भव्य मन्दिर, यह सर्वसृष्टि की राजधानी।
मधुर०—॥

यहाँ की है यह पवित्र शिक्षा।
कि सत्य पहले फिर आत्म-रक्षा॥
बिके हरिश्चन्द्र थे यहीं पर, यह सत्यशिक्षा की राजधानी।
मधुर०—॥

वह वेद ईश्वर की सत्यवानी।
बनें जिन्हें पढ़ के ब्रह्मज्ञानी॥
थे व्यास जी ने रचे यहीं पर, यह ब्रह्म-विद्या की राजधानी।
मधुर०—॥

वह मुक्तिपद को दिखानेवाले।
सुधर्मपथ पर चलानेवाले॥
यहीं फले फूले बुद्ध शङ्कर, यह राज-ऋषियों की राजधानी।
मधुर०—॥

सुरम्य धारायें वरुणा असी।
नहाएँ जिनमें कबीर तुलसी॥
भला हो कविता का क्यों न आकर, यह वागविद्या की राजधानी।
मधुर०—॥

विविध कला अर्थशास्त्र गायन।
गणित खनिज औषधि रसायन॥
प्रतीचि-प्राची का मेल सुन्दर, यह विश्वविद्या की राजधानी।
मधुर०—॥

है मालवी की ये देशभक्ति।
यह उनका साहस यह उनकी शक्ति॥
प्रगट हुई है नवीन होकर, यह कर्मवीरों की राजधानी।
मधुर०—॥

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संपादकीय

हमारी महती परंपरा

एक लंबे व्यवधान के बाद पत्रिका यह अंक पाठकों के पास पहुँच रहा है। इस बीच देश के भीतर और बाहर अत्यन्त महत्त्वपूर्ण घटनाएं घटी हैं। राजनीतिक स्वाधीनता प्राप्त करने के बाद देश को अनेक जटिल समस्याओं का सामना करना पड़ा है। सर्वत्र यह अनुभव किया गया है कि इस देश को जिस बात की सबसे बड़ी आवश्यकता है वह है चरित्रबल। बड़े बूढ़ों का ध्यान बार बार देश के नौजवानों की ओर आकृष्ट हुआ है। उनकी जिज्ञासा-वृत्ति की कमी के लिये दुःख प्रकट किया गया है, उनकी परिश्रम-कातरता को देखकर क्षोभ प्रकट किया गया है और उनकी चरित्रगत दुर्बलताओं को देखकर क्रोध प्रकट किया गया है। परन्तु सारे दुःख, क्षोभ और क्रोध के पीछे यह विश्वास काम करता रहा है कि देश के ये नौजवान ही भविष्य में इस संसार को रहते योग्य बना सकते हैं। आशा की ज्योति-कण अगर कहीं है तो इन युवकों में ही है। देश के वृद्धजनों की आँख बार बार युवकों की ओर ही फिरी है।

काशी हिन्दू विश्वविद्यालय के संस्थापक ऋषिकल्प महामना मालवीय जी का देश के युवकों पर अखण्ड विश्वास था। उन्हें ज्ञान से, तपस्या से और आत्मबल से समृद्ध बनाने के उद्देश्य से ही उन्होंने इस महान् विश्व विद्यालय की स्थापना की थी। देश उन दिनों पराधीनता के पाश से जकड़ा हुआ था, जीवन के हर क्षेत्र में देशवासी नाना प्रकार की बाधाएं अनुभव कर रहे थे। मालवीय जी महाराज हार माननेवालों में नहीं थे। देश की उगती हुई पीढ़ी पर दृढ़ विश्वास रखते हुए उन्होंने इस महान् विद्यापीठ की स्थापना की थी। हिन्दू विश्वविद्यालय के विद्यार्थियों ने अपने महान् संस्थापक को निराश नहीं किया। त्याग और आत्म-बलिदान के अवसर पर वे पीछे नहीं रहे। यह महती परंपरा हमें विरासत में मिली है। सब प्रकार की कठिनाइयों से जूझ कर आगे बढ़ने की, सब प्रकार के क्षुद्र स्वार्थों की अपेक्षा देश-हित को ऊपर रखने की और आवश्यकता पड़ने पर देश के कल्याण के लिये सब कुछ को निछावर कर देने की परंपरा मामूली परंपरा नहीं है। हमें दृढ़ता और आस्था के साथ इस परंपरा को कायम रखना है। देश के सामने जो नई परिस्थितियां आई हैं, नवीन शक्तियों से मुक्त होने से जो नई उलझनें पैदा हुई हैं उनके लिये आज के युवकों को नये ढंग से प्रस्तुत होना होगा। इस विश्वविद्यालय के प्रत्येक विद्यार्थी को स्मरण रखना होगा कि उसे अपने विश्वविद्यालय के महान् संस्थापक की आशाओं के अनुरूप बनना है।

सबसे पहला कर्तव्य

परन्तु यह नई उलझनें क्या हैं? हमारी सभ्यता हजारों वर्ष पुरानी सभ्यता है। इसके गुणों और अवगुणों की जड़ गहराई तक पैठी हैं। नई शिक्षा के फलस्वरूप हमारे

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समाज के सोचने-विचारने वाले अंश में नई दृष्टि प्रतिष्ठित हुई है जो सब समय इस शिक्षा से अपरिचित जन-समूह की दृष्टि से मेल नहीं रखती। नई शिक्षा ने हमारी दृष्टि धीरे धीरे परलोक से हटाकर इसी मर्त्यलोक के मर्त्यजीवन की ओर केन्द्रित कर दी है। हमने क्रमशः यह अनुभव करना शुरू किया है कि मनुष्य को इसी जीवन में सुखी बनाना ही हमारा महान् कर्तव्य है। इस दृष्टि के प्रतिष्ठित होने के फलस्वरूप जीवन की प्रत्येक क्रिया और विचार के मानों में परिवर्तन हुआ है। जिस समाज-व्यवस्था को पहले यत्न पूर्वक सुरक्षणीय माना जाता था उसके प्रति शिक्षितों की आस्था क्रमशः क्षीण होती जा रही है। सिद्धान्त रूप में हमने मनुष्य मात्र की समता और उसे इसी जीवन में सुखी और समृद्ध बनाने की बात स्वीकार कर ली है। अपने विधान में हमने देश के प्रत्येक प्राणी को यह समानता का अधिकार दे दिया है। किन्तु हमारे पुराने संस्कार भी बने हुए हैं। पुराने संस्कारों के साथ नये विचारों का विचित्र मिश्रण चल रहा है। सब समय सब के लिये यह समझना कठिन हो जाता है कि जीवन-व्यापारों का जो मान परिवर्तित हो रहा है उनका वास्तविक स्वरूप और उपयोगिता क्या है। इस बात को ठीक ठीक जानकारी के लिये गंभीर अध्ययन और अनासक्त दृष्टि की आवश्यकता है। इसलिये हमारा सबसे प्रथम कर्तव्य है गंभीर अध्ययन और अनासक्त दृष्टि की प्राप्ति। देश और काल में व्याप्त मनुष्य के प्रत्येक अंग का सूक्ष्म अध्ययन करते ही हम उसके विचारों और क्रियाओं का यथार्थ स्वरूप समझ सकते हैं और बदलने वाले या बदले हुए मानों की वास्तविक गति और उपादेवता जान सकते हैं। इसके लिये कठोर परिश्रम की आवश्यकता है। इसी अध्ययन के द्वारा हम अपनी समस्याओं का ठीक ठीक स्वरूप समझ सकते हैं। इसलिये गंभीर अध्ययन हमारा प्रथम कर्तव्य है। हम लोग इस विश्वविद्यालय में मुख्य रूप से इसी उद्देश्य से एकत्र हुए हैं। इस बात को हमें कभी नहीं भूलना चाहिए।

किन्तु विश्वविद्यालय में हम केवल ज्ञान पा लेने के उद्देश्य से ही नहीं आते। ज्ञान का यथार्थ अधिकारी बने बिना कोई ज्ञान नहीं पा सकता। इसलिये हमें अधिकारी भी बनना चाहिए। जिसमें श्रद्धा नहीं होती और तपस्या नहीं होती उसे ज्ञान नहीं देना चाहिए—यह प्राचीन आचार्यों का निर्देश है। गीता में भगवान् ने कहा है कि जो अधिकारी न हो, जिसमें तप और भक्ति न हो उसे यह ज्ञान नहीं देना चाहिए और आधुनिक अनुभव बताता है कि ऐसे अनधिकारी को यदि यह ज्ञान दिया भी गया तो लाभ की अपेक्षा हानि ही अधिक होती ह।

संयत और मर्यादित जीवन की आवश्यकता

गंभीर अध्ययन के लिये संयत जीवन की आवश्यकता है। पिछले कई वर्षों के शिक्षा-विशारदों के मत का विश्लेषण किया जाय तो जान पड़ेगा कि विद्यालयों की अनुशासन-हीनता सबसे अधिक उनकी चिन्ता का कारण रही है। यह बड़े दुःख की बात है, क्योंकि यदि सचमुच ही देश की उगती हुई पीढ़ी में अनुशासन-हीनता आ गई है तो देश का भविष्य अन्धकारमय है। जिसने आरंभिक जीवन में विचारगत संयम और आचारगत मर्यादा की बात नहीं सीखी वह आगे चल कर क्या सीखेगा। बड़ी चीज का दाम भी बड़ा

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होता है। जिस गंभीर अध्ययन और अनासक्त दृष्टि के पाने के लिये हम विश्वविद्यालयों में एकत्र होते हैं उसके लिये बहुत बड़े मूल्य के चुकाने की आवश्यकता है। वह मूल्य रुपयों पैसों में नहीं चुकाया जा सकता। आत्मदान ही उसका यथार्थ मूल्य है। ज्ञान को प्राप्त करने के लिये बड़े संयम की आवश्यकता होती हैं और संयम वह वस्तु नहीं है जो अनायास प्राप्त हो जाय। उसके लिये प्रयत्न पूर्वक अभ्यास करने की अवश्यकता होती है। प्रयत्न करना मनुष्य का सहज धर्म है। इसलिये प्रयत्न से घबराना नहीं चाहिए। साधारणतः इस विषय का सारा दोष विद्यार्थियों के मत्थे मढ़ दिया जाता है। पर सचाई यह है कि विद्यार्थी केवल पुस्तकों में लिखे हुए या बड़ बूढ़ों के कहे हुए उपदेशों से शिक्षा नहीं ग्रहण करता—ठीक उसी प्रकार जिस प्रकार वृक्ष केवल दूसरों के हाथ से ढरकाए हुए पानी से जीवन नहीं पाता—वातावरण से भी उसे रस लेना पड़ता है। वृक्ष तभी स्थायी होता है जब वह वातावरण से सहज भाव से रस खींचने लगता है। हमारे देश के अधिकाश विद्यालयों में इस प्रकार के वातावरण की कमी है जहाँ से विद्यार्थी को संयम विचार और मर्यादित जीवन की सहज शिक्षा मिल सके। उस प्रकार के वातावरण की आवश्यकता है। पर यह हो कैसे ? जब तक विद्यालय का प्रत्येक प्राणी प्रयत्न-पूर्वक संयत विचार और मर्यादित जीवन का अभ्यासी नहीं होता तब तक वातावरण नहीं प्रस्तुत होता और जब तक वातावरण नहीं प्रस्तुत होता तब तक विद्यार्थी सहज ढंग से अनुशाशित जीवन की शिक्षा नहीं पा सकता। दोनों परस्पर-सापेक्ष हैं। इसलिये प्रत्येक व्यक्ति को इस ओर सावधान रहना चाहिए। वातावरण बनाने के लिये प्रयत्न करना प्रत्येक व्यक्ति का धर्म है। संयत और मर्यादित जीवन से मनुष्य धार्मिक बनता है।

हमारे विश्वविद्यालय के संस्थापक ने बार बार धर्ममय जीवन पर ज़ोर दिया था। विश्वविद्यालय के बारहवें उपाधि वितरणोत्सव के अवसर पर उन्हों ने कहा था कि "हम धर्म को चरित्र-निर्माण का सीधा मार्ग और सांसारिक सुख का सच्चा द्वार समझते हैं। हम देशभक्ति को सर्वोत्तम शक्ति मानते हैं जो मनुष्य को उच्चकोटि की निस्वार्थ सेवा करने की ओर प्रवृत्त करती है।" उन्होंने इन्हीं दो बातों के आधार पर विश्वविद्यालय के विद्यार्थियों में चरित्रबल ले आने की बात सोची थी। आज जब समूचे देश में अनुशासन के अभाव की बात कही जा रही है तो कम से कम हिन्दू विश्वविद्यालय के विद्यार्थियों तथा अन्य लोगों को तो अपने संस्थापक के महान् आदर्शों को मूर्त रूप देने का व्रत ले ही लेना चाहिए।

'देशभक्ति सर्वोत्तम शक्ति है'

'देशभक्ति' शब्द का प्रयोग तो बहुत होता है पर बहुत कम लोग समझते हैं कि इस का वास्तविक अर्थ क्या है। देश की सेवा कहने से भी वह सब बातें नहीं प्रकट होतीं जो 'देशभक्ति' शब्द का प्रतिपाद्य हैं। देश केवल मानचित्र नहीं है। देश-सेवा का अर्थ है देश के कोटि-कोटि लोगों को अज्ञान, कुशिक्षा, दारिद्रय और परमुखापेक्षिता से बचाना। जिसके मन में यह बड़ा संकल्प आ जायगा वह कभी निचली श्रेणी के स्वार्थ का शिकार नहीं हो सकता। इस देश की समूची जनता को ठीक ठीक समझने के लिये इस देश के

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इतिहास की जानकारी आवश्यक है; इस देश की समस्त प्राकृतिक शक्तियों का—जंगलों पहाड़ों का, खनियों का, नदियों का—ठीक ठीक ज्ञान अपेक्षित है; इनका सर्वोत्तम उपयोग पहले किया जाय इस कौशल की जानकारी भी ज़रूरी है और देश में बसी हुई सैकड़ों जातियों, उपजातियों, श्रेणियों और जमातों के आचार-विचार धर्म-नियम रीति-नीति का अध्ययन भी आवश्यक है। जो इस विशाल देश की सेवा करना चाहता है उसे इसकी समाज-व्यवस्था को खूब परिश्रम से समझना चाहिए। सब के लिये गंभीर अध्ययन और अविचल मनोयोग की आवश्यकता है। विना ठीक वस्तुस्थित को समझे देश-सेवा करने का काम खतरे से खाली नहीं है। विश्वविद्यालय ही इस प्रकार के ज्ञान प्राप्ति करने के उत्तम केंद्र हैं। विश्वविद्यालय की शिक्षा का उद्देश्य है जनता को ठीक ठीक समझाना और समझ कर उचित कल्याण मार्ग की ओर ले जाना।

परन्तु देश-सेवा ही देशभक्ति नहीं है। यदि सेवा करने वाले के मन में कोई ऐसी भावना हो कि वह कुछ उपकार करता है, दया करता है, तो वह देश की जनता की ठीक सेवा नहीं कर सकता। इसीलिये हमारे संस्थापक ने 'देश-भक्ति' शब्द का प्रयोग किया था। देश की जनता में अखण्ड विश्वास और श्रद्धा के भाव लेकर ही हम उसकी सेवा कर सकें तो अच्छा हो। मनुष्य की सेवा में ही परमात्मा की सेवा है। हमें भूलना नहीं चाहिए कि विश्वविद्यालय में हम ज्ञान की साधना बहुत ही पवित्र है। जितना ही हम इस पवित्रता का ध्यान रखेंगे उतना ही हमारा अध्ययन गंभीर होगा। इस पवित्र कर्तव्य को स्मरण रखने से हमारे अध्ययन में गंभीरता, उत्तरदायित्व और कल्याणबुद्धि आएगी और हमारे भीतर अनासक्त और अनाविल दृष्टि प्रतिष्ठित होगी।

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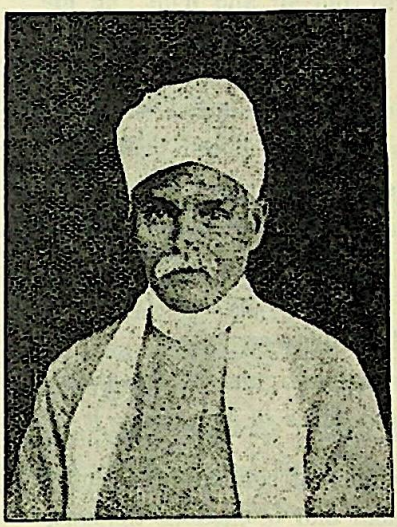
THE MAHAMANA

Prof. B. L. Sahney,
Banaras Hindu University.



1. The Mahamana was a man ideal,
In whose magnific mind, in measure meet,
All gifts of nature, all accomplishments
Of character and culture were combined;
He was the gentlest spirit that ever breathed,
Who never spoke a harsh offensive word,
But always assuaged acerbities
Of public life in which his presence shone
With the white radiance of the mystic rose
That charms the breath of heaven on peaks divine.

2. He was the shining mirror of courtesy,
The shield of woe, the bulwark of the weak,
The citadel of strength that stood erect,
Firm proof against the fierce and wanton winds
Of alien persecution truculent;
A warrior wise who knew all moods but fear,
His spear was ever ready for assault
Upon the bastions of what is base;
He fought not to divide but to unite
To build an everlasting bridge to span

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The gaping gulf that sunders man from man.
His valour was unbounded in the cause
Of justice and compassion to our kind,
Nay, to all sentient creatures that with man
Partake of earth and air and light and life
In this bizarre, mysterious, jostling world.

3. Type of the Good, the Beautiful, the Wise,
Of Justice even-eyed and Power benign,
He was so true that thoughts of him sufficed
To make dreams truths, and fables histories:
The tongue of prophecy, the mouth-piece pure
Of the Divine, and when we heard him speak
We felt we fed on empyrean fare
And drank the fragrant juice of *Soma* distilled
By fairy hands in fields of Paradise.

4. He was the Founder of this splendid shrine
Of ancient wisdom and of modern thought,
The Sire immortal of this family
Of teachers and the taught, come from all parts
Of Ind, nay, from beyond the alien seas,
And congregated on the campus of
This University which shines aloft
Upon the Ganges' consecrated bank
Like the Rainbow semi-circular in the sky;
And little wonder that it soon became
The home of Indian nationalism strong,
The focus of revolt against the rule
Corrupt, oppressive, irresponsible,
Of scheming aliens in our native-land.

5. His person handsome, graceful, lily-white,
His features bland and of exquisite turn,
A stately turban on his classic head,
The sacred mark ablooming on his brow
Like Venus on the forehead of the Morn,
And a long muffler wound about his neck,
And thence descending equal on either side
Adown his shoulders in consummate taste,

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Attired from top to toe in spotless white,
He was the radiant bloom of sanctity,
An attribute essential of his mind,
His inmost soul, surging through all his thoughts,
His words, his deeds, his movements fearless, free,
And dedicated to the Deity:
His life a lyric was of loveliness,
A lofty sermon on self-sacrifice,
And dedication deathless to the cause
Of Indian freedom, self-sufficiency,
And universal love and brotherhood.

6. He was, in sooth, a Rishi of our times,
A man whose perfect purity of mind
And passion for the One, the Absolute,
Gave him a vision of Reality,
The hidden Mountain source supreme from which
Tumbles the Torrent of tumultuous Time
Adown the slopes precipitous of Space,
Fierce flowing through the chequered vale of Life,
With tides of day and night and birth and death,
Down to the Ocean of Eternity.
And in his eyes there shone such magic light,
Men looked at him and went forth healed of all
Their selfish sentiments and passions dark,
Imbued for ever with a sense sublime
Of public good and social usefulness,
And the abiding verities of life.

7. His very memory is a benign
And permanent possession of the mind,
That elevates the soul to altitudes
Of bliss undying and serenity:
The Mahamana was a man unique,
Whose like we never shall behold again,
Though ages in their flight may bring to light
The miracles manifold of Nature's might,
And all the wonders of Eternity.

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CONVOCATION ADDRESS*—BANARAS HINDU UNIVERSITY

Mr. Vice-Chancellor, it is with peculiar pleasure that I have to-day received from your hands the emblem of the honour which the University has conferred upon me. For it was under, the Vice-Chancellorship of your great and illustrious predecessor, Pandit Madan Mohan Malaviya, that I was appointed to the Chair of Indian Linguistics in this University more than thirty years ago. To him more than to any other individual, through his vision, statesmanship, and single-minded devotion to a great ideal was due not only the inception of the idea of founding a University in Banaras, but also the realisation of that idea. Of him truly we may use the epitaph of Christopher Wren *Si monumentum requireris, circumspice*—if you demand a monument to his name, gaze around. To that memory I would add also the name of the Pro-Vice-Chancellor of those early formative days Dr. A. B. Dhruva, whose wise administration and devotion to a scholar's ideals guided the nascent university along the true path of academic development.

And now after thirty years of exile in my native country I return to the land and the city of my adoption. In a man's life thirty years is long span, but in the life of a University it is but a brief period. Yet what immense changes, what tremendous growth does the returning exile descern! When in 1922 I was called to the newly-established Chair of Sanskrit in London, this great University campus was still largely a bare plain, upon which the scattered buildings then erected stood as it were only as symbols of the future that was yet to be. It is true that the Faculty of Arts, inheriting the tradition of the Central Hindu College, was in active operation, as too the School of Ayurvedic Medicine; there were the beginnings of the Faculty of Science, but the College of Engineering was still largely occupied with problems of lay-out and of building.

Now what change of scene—a great University in full operation of its manifold activities, with its seven Faculties of Oriental Learning, of Theology, of Arts, of Science, of Technology, of Law and of Medicine, with its fourteen Colleges, with its academic staff of nearly 400 and a student population which this year numbered 7,916, more than half of whom are housed in university or college hostels, thus largely already fulfiling your

* This address was delivered by Sri Ralph Turner, Director of the School of Oriental and African Studies, London, on the 26th December, 1951.

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Founder's ideal of a residential university. And if in passing I note the fact that beside degrees in Oriental Learning and Theology you have also in the Faculty of Technology a diploma of soapmaking, recalling our English saying that cleanliness is next to godliness, it is not an altogether frivolous interpolation, for I believe it to be indicative of the success with which the University has built the study of modrn techniques on the firm foundation of a traditional faith and learning without which these other things may be but sounding brass and tinkling cymbal. Then there is this great domain of 1,300 acres which fills with envy the visitor from London where recently we were overjoyed to be able to add 13 acres to the modest area of our central University precinct. And to house all this what range of noble buildings, line on line and pile on pile. One of your poets describes Gangā as adorning the head of Siva:

> sā gangā kasya sevyā na bhavati bhuvane sajjanasyātibhāvyā
> brahmāṇḍam plāvayantī tripuraharamaṇḍalaṁ maṇḍayantī

But for her you have erected an ornament upon her shore, not only in this array of splendid buildings, but also in spiritual and intellectual values as rich and deep as the life-giving waters of Gangājī herself in her course by the templed ghats of Kāśī.

It is no wonder that returning after my long sojourn to such a place I should be most deeply affected by the high honour the University has conferred upon me. Nevertheless it is an honour which is offered not so much to me individually as to the institution of which I happen to be the Head, the School of Oriental and African Studies in the University of London, in recognition, as I venture to hope, of the great part it is playing now, and of the still greater part it will play in the future, in interpreting to my countrymen the great cultures of Asia, its history, its laws, its religions, and all its languages and literatures, both of the past and of the present day. Nor is that its only contribution to studies which are of mutual interest to you in Banaras and to us in London, but the School, by attracting to itself in increasing numbers students and scholars from every part of the world, has become in a very real sense a meeting-place of Eastern and Western scholarship with all the fructifying results which arise from the the interaction of differing modes of thought. Let me quote but one instance. Members of the Department of Phonetics and Linguistics, deeply interested, under the guidance of Professor J. R. Firth, in the phonological analysis of an immense range of modern forms of speech and in the formulation of a philosophy of language, find that present-day problems are illumined

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by the speculations of the Sanskrit grammarians and particularly of that great monistic linguist Bhartṛhari.

This consideration emboldens me to ask your indulgence while for a few minutes I expose some of the difficulties to be overcome and problems to be solved, if oriental studies are to play their full and proper part in the academic organisation of an English University. I belive moreover that problems of a not dissimilar nature may have to be faced in those of your institutions here which are devoted to oriental learning and research. If so, exchange of experience may be of mutual profit.

The School of Oriental Studies was established during the First World War as an integral part of the University of London. Within its sphere of studies were included the languages and literatures, the history, laws, religions and philosophies of all the countries and peoples of Asia and Africa, both past and present. I may remark in passing that the first occupants of the four University Chairs then tenable at this School—Sanskrit, Persian, Arabic and Oriental History—were, like its first Director, Sir Denison Ross, and others to follow them, all men who had taught and worked in Indian Universities. The inter-war years were a period of steady growth, but though in many respects its development exceeded the expectation of its founders, in one it fell short. Although students came from abroad in increasing numbers, mainly for postgraduate study and research, especially from this country (at one time we had as many as 100 Indian students in a single year), we failed in the main to attract the English undergraduate to our studies. Happy as those years were for me personally, surrounded as I was by a band of Indian research students, I would also have welcomed with pleasure some of my own countrymen.

Then came the Second World War, bringing in its train two circumstances of great significance for the future of oriental studies in Great Britain. Once again the fact of Indian divisions fighting side by side with our own stirred the imagination of my countrymen and awakened in their hearts a profound sense of gratitude and comradeship. At the same time immense numbers of our own men and women, a whole cross-section of the British people, served in Army, Navy, and Air Force for long years abroad, largely in Eastern lands and seas, and among them no fewer than 1,700 who before going abroad had attended courses of instruction at the School of Oriental Studies. These facts and the relisation of the changing relations and growing interdependence between East and West moved the Foregin Secretary to accede to our representations and even during the

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stress of war to appoint a Commission, under the Chairmanship of Lord Scarbrough, to examine the facilities offered by universities in Great Britain for the study of Oriental, Slavonic, East European and African languages and culture and to formulate recommendations for their improvement.

The Commission's Report, which was published in 1947 and for the implementation of which Parliament has voted large sums of money, was indeed a New Charter for Oriental Studies in Great Britain. The central and essential feature of the Report was its insistence on the necessity of building up strong and co-ordinated academic departments in all universities undertaking either the initiation or the further development of one or another aspect of oriental learning; but it continued to lay upon the the University of London in its School of Oriental and African Studies the duty of pursuing and developing its teaching and research over the whole range.

As a result of this and of the interest and enthusiasm of so many of the young men returning from abroad after the War, the development of the School, the expansion of its staff and the increase in the number of serious university students, during the past five years has within its own sphere been comparable with the marvellous development of this University, to the admiration for which I gave expression at the opening of this address. Its academic posts alone, numbering less than 40 before the War, will by the end of the present session have been expanded to about 200, including 17 University Readerships and 21 University Chairs. I think that I am justified in claiming that no such body of orientalist teachers has ever existed before in one University or in any one country. Many of them are young, but, Mr. Vice-Chancellor, if you were to visit us, as I hope some day you will, you would be delighted by the enthusiasm, vigour and devotion which inspire their work.

I come now to the problem to which I referred, and which I belive must be yours as well as ours. How can these studies be made to take their part in the normal course of university education? It is true that the School provides practical courses of instruction in a very wide range of languages, and indeed we have some pride in the fact that it is the only institution in the United Kingdom and perhaps in the whole world able to give such instruction in upwards of 100 Oriental and African languages, of which advantages is taken by largs numbers of students from many walks of life not pursuing a regular university course. But the effectiveness

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of these courses is intimately bound up with the fact that the teachers are members of an academic body, all actively engaged in university teaching and research. For the University of London in adopting the term 'School' for several of its institutions, such as the School of Slavonic Studies, the School of Economics, the School of Tropical Medicine and so on, recalls the medival use of the Latin word 'schola' to denote a part of a university. The special problem which faces the pursuit of oriental studies in an English University to-day is not that such studies do not provide a liberal education nor that we are now lacking in teachers to instruct the students in the subjects they choose nor that it is beyond the grasp of the student to grapple with difficult oriental languages, so different in appearance and structure from his mother-tongue or from those which he has learnt at school. The special difficulty is that the student coming to the university from an English school has no previous acquaintance with the oriental subject he proposes to read for his university degree. In this he is in a very different position from the undergraduate who is to read the classical languages of Latin and Greek, or modern languages like French and German, or history, or mathematics or the natural sciences. He has no prior knowledge of his oriental subject, upon which his teachers can base a university course.

It is true that in the Oriental faculty of an Indian university this particular difficulty does not exist in respect of the classical languages of India, in particular of Sanskrit, some knowledge of which I understand is required by Banaras Hindu University of all its matriculating students. But as soon as you extend your first degree courses to other Asian languages, as extend them you must, you will be face to face with the same difficulty as ourselves. Already and, I would venture to say, inevitably you have included Chinese among the subjects of study in the Faculty of Oriental Learning. The foundation of the College of Indology under the inspiring direction of Professor Majumdar ensures that your studies will be extended to many other Asian languages and cultures outside the boundaries of India, for into what part of Asia has the influence of India not penetrated, into what Asian languages have Sanskrit or Pali books not been translated, or what Asian country has not been subject to the benign influence of the great religion first preached here in the Deer Park at Sārnāth by its Founder, Gautama Buddha. Tibetan, Chinese, Japanese, the languages of Burma, Siam, Indo-China and Indonesia must all come within the purview of a Faculty of Oriental Learning and a College of Indology situated in Banaras, to say nothing of the ancient Iranian, Tocharian, Turkic and Mongolian languages of Central and Northern Asia, into all of which Buddhist scriptures were translated.

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You may say, Mr. Vice-Chancellor, that I am imposing too great a burden upon your Faculty of Oriental Learning. But I am often conscious of the fact that while we in the West have concerned ourselves far too narrowly with western culture and western history, your universities in India have on their part neglected too much the study of the culture and history of your Asian neighbours. In the future these studies must form a part of university curricula in India and where more fittingly than in Banaras?

I come then to the problem which will be common to us both in London and here—an undergraduate course in a language and literature which the student must tackle from 'scratch' but which must be designed to lead to a First Degree. Now the preparation for a First Degree whether in an oriental subject or in any other entails the metamorphosis of the student from the state of the undergraduate, or rather the schoolboy, to the state of a graduate—the intellectual counterpart of the emergence of the butterfly from its chrysalis—and the time in which this metamorphosis is expected to be realised is normally the space of three years. Wherein then consists this metamorphosis which a university makes it its work to achieve, and which it is prepared, after suitable examination, to certify as having taken place. As everybody will agree, this change is as complex as it is remarkable, but of its many aspects one is particularly obvious because it is linked with the newly-fledged graduate's ability to proceed to a higher degree, and this implies his capacity, with some guidance from his teachers, to conduct independent research.

It has been the experience of some of my colleagues at the School of Oriental Studies that the task of bringing the student who starts from scratch to the point where he can begin to conduct research is possible of achievement within a period of three years. But a number of them are anxiously asking the question whether the need for keeping to this time limit does not force them and the student to ignorance aspects which whould form an integral part of any university education.

For I want to make this point: although up to the present the great majority of students who take an Honours degree in an oriental subject at an English University do it with the intention if possible of devoting themselves to an academic life and so to study and research, nevertheless our oriental studies will not have their full and proper impact upon the intellectual life of the country until, for the man or woman who after graduation intends to earn his livelihood outside the academic cloister,

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a University degree course in an oriental subject is considered as liberal an education as a course in any other of the 'Humanities'. As orientalists, then, we must aim at imparting, through the medium of our subject, the benefit of a liberal education in no less degree than if the student had chosen one of the more frequently trodden paths.

The concept of 'liberal education' is one of the basic ideas of a university education. The word 'university' evokes the idea of catholicity within the *universitas litterarum* "*visvavidyālaya*", in other words, the idea of a uniform alignment of all studies, no matter how diversified they may be. Up to a point this ideal is still uphold in eastern and western universities alike although it may be said to have been completely fulfilled only during the Middle Ages when the field of knowledge was much more limited. In the present day when the frontiers of knowledge have been pushed so much further out in all directions and when the mastery of a single branch may demand a life-time of application, the unity which still entitles our universities to their name lies in their attitude or way of approach to the acquisition of knowledge rather than in the medieval idea of bringing the whole range of human knowledge within the orbit of a single mind. This common attitude or outlook can perhaps be most easily deduced by comparing the way of learning at school with the way of learning at a university. At school, if I may for the sake of illustration over-simplify the matter, a statement is to be taken as absolutely true and as such is something that has to be learnt and assimilated. In the university, if I may again generalize to an even greater degree, no statement whatever may be taken as absolutely true. It should always be seen as made by a given person at a given time and as such conditioned by the personlity, background, training, environment, learning, insight, vision and so on of this given person. If we regard this distinction as the most important element of university education the metamorphosis of the undergraduate student into the graduate is complete when through rigid discipline and under the guidance of his teachers he accomplishes this change of outlook which is implied in substituting the idea of relative truth for that of absolute truth. If despite the fact that the undergraduate studying an oriental language in an English university must give much of his time and energy to the assimilation of elementary facts about which there can be no diversity of opinion, his teacher nevertheless succeeds in performing this metamorphosis, then the student will have received a liberal education. For he will have acquired that detachment of outlook which is the great benefit to be derived from an academic study and which is more important than ever in this troubled period of transition and changing values.

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But it is just this dual approach to their subject which involves some of our teachers in difficulty when introducing the young undergraduate to his oriental language. On the one hand they must call upon the student to absorb a very great amount of fresh material, as if it were the truth, the whole truth and nothing but the truth, and on the other hand they must train him to bring a critical mind to bear on this very same material and to view it in the light of the relative truth of which I have just spoken. No single solution to the problem can be offered and the approaches chosen to deal with the difficulty may vary from subject to subject. But in quoting what a Professor of Chinese, with much experience of this problem, has said of the approach he and his colleagues use, I have chosen an illustration which may be of particular interest to your Faculty of Oriental Learning.

"Three methods of approach" he says "enable us to keep before even the beginner the university attitude, as opposed to the school attitude, towards learning".

"First we encourage him to compare aspects of his studies with similar aspects 'nearer home', that is in his own country or in countries with which he is more familiar than those of the east".

"Secondly we lay emphasis on the history of scholarship in our subject, by introducing the student to the history of problems and to the solutions offered by scholars at different periods and by showing them how certain discoveries of new material have solved or at least thrown light on problems that scholars in previous centuries have tackled without success".

"Thirdly we introduce the student as soon as possible to the technique of research, for by this we safeguard ourselves against overloading his memory with detail which he can find for himself, when needed, if he has been taught where and how to look for it".

These three approaches, exemplified from the practice of teachers of Chinese, have one thing in common. They place constantly before the student's eyes the inseparable unity of western and eastern efforts in the common search for truth, whether by direct comparison, or by tracing the history of a problem or by surveying in a bibliography the efforts brought to bear on a branch of learning as a whole.

It is this integration of eastern and western scholarship that we must strive to attain, whether in London or in Banaras. Only a short while ago, in 1946, the orientalists of Great Britain celebrated at Oxford the

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bicentenary of the birth of one of the greatest of our oriental scholars, Sir William Jones. As all know, it was in India and from Indian scholars that this great man acquired his knowledge, and he was the first effectively to direct the attention of British and indeed European scholars to the riches of Indian literature. Who does not know the famous lines that Goethe wrote on reading Jones' translation of Sakuntalā

> Willich die Blüthe des Frühlings, die Früchte des späteren Jahres,
> Willich was reizt und entzücht, willich was sättigt und nährt
> Willich den Himmel, die Erde mit einem Namen begreifen,
> Nenn' ich Sakontala mir, und so ist alles gesagt.

"The beauty of earth and sky, of plants and flowers and fruits, the beauty of all nature is comprised in thy name, O Śakuntalā".

The bicentenary of Sir William Jones has coincided in time with this great revival of Oriental and Indian studies in Great Britain and the present generation of scholars are proud to think that their contribution to studies which were brought to their country from India by that great scholar should in its turn have taken root here in Banaras side by side with the ancient learning of India itself. What can be more inspiring than to see Indian and British scholars who are working side by side on the same subjects derive the greatest possible benefit from the mutual exchange of ideas in their common search for truth. For in the words of Bhavabhūti:

> Ye nāma ke cid iha nah prathayanty avajñām,
> jānanti te kim api, tān prati naiṣa yatnaḥ:
> utpatsyate 'sti mama ko 'pi samānadharmā
> kālo hy ayaṁ niravadhir vipulā ca pṛthvī.

When a few days ago the Vice-Chancellor of Universities in every country of the Commonwealth stood at the Samādhi Stone in Delhi, offering their tribute to the memory of Mahātmā Gāndhi, there came into my mind one of those lines of scripture known to everyone of you here which the Mahātmā commended as a prayer in all places of education:

> Asato mā sad gamaya;
> Tamaso mā jyotir gamaya;
> Mṛtyor māmṛtam samaya
> Iti mayā samāptam, Bhavantaḥ śubham astu.

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THE GOLDEN AGE OF THE T'ANG DYNASTY (CHINA)

Dr. Rama Shankar Tripathi, M.A., Ph.D. (London).

It is perhaps ingrained in human nature to look back wistfully to the past and conjure up visions of an ideal primeval age when man lived in a state of perpetual bliss, free from want, misery, decay and death. Such fantasies may indeed be a source of solace and even inspiration to the poet, the religious preacher and the utopian dreamer, but sober history, at any rate, does not know of a *Satyuga*—golden age—of this description. On the other hand, the indications are that man has advanced by slow and painful stages from the darkness of barbarism and ignorance to the light of civilisation. As a result of this evolutionary process, the creative forces lifted mankind high and ushered in an era of unending possibilities or 'perfectability', as the French philosophers called progress. But the path of humanity has not been a smooth, straight, ascending course through time. It has been like that of a planet wheeling round a sun, giving us a perpetual alternation of springs and autumns, of development and elevation and then of downfall and destruction. Progress has been cyclic. The race lapses from vigour into stupor at intervals, and again gradually regains vitality. From the dim dawn of history some branch of the human family—the Egyptians, the Chaldarans, the Hindus, the Chinese, the Greeks, and the Romans—has reared up a splendid structure of civilisation, which after an existence of a few centuries fell into utter ruin. An analogy to these vicissitudes of human destiny is furnished by geology. Time and again, as a result of seismic upheavals, parts of the earth's crust have grown to stupendous heights called mountain ranges, and in the course of millions of years the destructive agencies of Nature have levelled them down, as they are slowly but surely grinding down the lofty Himālayas today. Thus, man has been eternally labouring, like sisyphus, to rise from the depressing depths of primitive life and scale the refreshing altitudes of cultural glory. During the peak-periods of civilisation man's genius blossoms forth in all its grandeur, and accordingly they have often been described as the golden ages of history. They are those rare epochs when wealth multiplies, and people not only enjoy the blessings of peace and prosperity but the still more precious blessing of unimpeded endeavour in noble aims and aspirations. Literature and art flourish. Poetry, painting, sculpture, music—in fact, all the arts that lead to refinement and in consequence add to the sweetness of life reach a high level of skill and excellence. If

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we examine and analyse the chronicles of the past, it would appear that these occasional efflorescences of the human spirit were mostly the outcome of strong and benevolent rule when the sceptre was weilded by men of penetrating intellect, uncommon breadth of view and tremendous energy. They were dynamic enough to undertake arduous military campaigns to augument their territory and might, or to prevent aggression, and far-sighted enough in times of security to promote the arts of peace. The majority of them were doubtless men who felt no scruples in ministering to the coarser demands of the flesh; nevertheless, it must be conceded that their main purpose of life was to protect the people and to make them happy and contented. We are often reminded in our "moralising literature" of the abiding value of "spiritual realities", but for the flowering of the golden ages of our civilisation religion or ascetisicm has hardly been an important contributory factor, nor profligacy or moral laxity a great hindrance to advance or the chief cause of social and political decline. Without further enlarging upon this point, which would appear to many persons not only novel but even erroneous, I may mention here, to give more weight to my observation, the most brilliant periods in human history to which the consensus of opinion among scholars has awarded the gold medal. It is believed that ancient Egypt had its "bloom period" in the 15th century B.C. under Amenhotep III, whose kingdom extended from Nubia to the Euphrates with Thebes as the capital. The virile Kaldi or Chaldarans in the time of Nebuchadrezzar or Nebuchadnezzar (605 B.C—562 B.C.) raised Babylon to the pinnacle of splendour and wealth, which aroused the rapacity of the Medes and the Persians. Then a new race on the eastern seaboard of the Mediterranean took over the torch from the sinking empires of the Near-East and created a superb polity. After the first flush of civilisation in Ionia, Greece made rapid strides and Athens had her golden days under that idealist democratic statesman, Pericles (499 B.C.—429 B.C.). The light of art and intellect flamed over the entire Greek world before it was dimmed in Athens. One of the outposts of Hellenic culture was Alexandria, which in the time of Ptolemy II Philadelphus (285 B.C.—246 B.C.) developed such vitality that his reign has been classed among the golden ages of history. Rome rose to its nadir of greatness under Augustus (63 B.C.—14 A.D.) and Hadrian (76 A.D.—138 A.D.), and the most glorious chapters in the history of Islam pertain to the reigns of Harün al Rashid (A.D. 763-809) and his son, Mämün, at Baghdad, and of Abd er Rahman III (912-61 A.D.) at Cordova in Spain. The ages of Queen Elizabeth in England (1558-1603 A.D.) and Louis XIV of France (1643-1715 A.D.) have also claimed the historian's gold medal, but if we turn aside from the

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highlights of their reigns we would find that the vast majority of people were living in misery, abject fear and destitution plodding like their oxen from sunrise to sunset throughout the year. In India, the Gupta period has generally been described as the golden age of its history, but the title may well be disputed by the epoch of Asoka, who attempted to establish an empire based on universal love, harmony and non violence. He presents a curious combination of monarch and missionary, and his exalted conception of royal duties may serve, even today, as a beacon light to the passion torn, distracted humanity. It is noteworthy that with the exception of As'oka other rulers like Ptolemy II, Hadrian, Hārūn al Rashid and Abd er Rahman III, who created golden ages in their respective countries, were ease-loving and sensual, although they did not allow indulgence to mar their capacity or fitness for their royal tasks. Having thus surveyed the principal peaks of progress in world history, let us now take a peep into the backwaters of Chinese annals. Did China have any period coloured with golden hues? As in the case of India, there are in its history also two epochs—one of the Han dynasty (*c.* 206 B.C.—220 A.D.) and the other of the T'ang-during which the surging impulses bore fruit in national revival, growth and brilliance. The T'ang dynasty held sway over China from A.D. 618 to 907. During this period the flame of civilisation burned more brightly than before and lit a far wider geographical area. Accordingly, historians often discribe it as the golden age of Chinese history in preference to the epoch of the Han. The T'ang built upon the foundations of polity and culture laid in the past under the Chou, the Chin, and the Han, The T'ang came after the oppressive rule of the Sui dynasty. Its last member, Yang Ti, is represented as "an imperial madman", "a half-barbaric genius"—indeed, a Chinese version of Muhammad Tughlaq. He used to replace the fallen petals of flowers and leaves of trees in his vast palace by those made of silk, and thus satisfied himself with the comfortable thought that even the seasons were at his command. Like many a monarch, he enjoyed to the full the pleasure of a large and gay harem. Once in a fit of cynicism he ordered the rural population to move to the towns, so that his brave bowmen might be able to shoot at will in the countryside. At last, Namesis overtook him, and Li Yüan, Duke of T'ang, against whom he had his own treacherous designs, was raised to the throne in 618 A.D. by the combined efforts of his valourous son, Ti Shih Miu, and of his daring daughter, Ti Shih. Li Yüan fixed his capital at Ch'angan, near the site of the Han city and beautified it with tanks and gardens, parks and palaces, pagodas and pavilions. In 627 A.D. Kao Tsu, for that was the royal title of Li Yüan, abdicated in favour of his son, Li Shih Miu, who

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had proved his mettle in many a sanguinary battle, and who had frustrated the intrigues of his brothers, Chien Chang and Yūan Chi, and killed them. During the reign of Li Shri Miu, China rose to heights of splendour and progress. He changed the name of the capital from Ch'angan to Si-an, which signifies Peace of the West. It was thus symbolical of the peace and prosperity be had brought about in the country, which had become lean, rent and reduced to beggary in the time of the brutal Yang Ti. But China under Li Shih Miu did not attain to greatness without the usual expansion of territory and influence. He subduced the Hsiung-nu, the uighuss and the other broder tribes, and also the Turks under Qadir Khan. The whole of inner Mongolia, up to the frontiers of the Gobi desert, acknowledged Chinese suzerainty, and the Emperor adopted the additional title of "Heavenly Khan". Indeed, Li Shih Miu's was an uninterrupted military career of success except that his arms met with a reverse in northern Korea. He put special reliance on the cavalry, he increased the effectiveness of the army by improving its discipline, organisation and weapons. In the machinery and methods of administration he did not affect any sweeping changes. Centralisation was its keynote in general. All officers received appointment from the capital, and they were, as a rule, recruited on grounds of ability through the system of examinations, which was fully developed and perfected under the T'ang. Once again the call rang through every hut and hamlet of China urging men of promise to repair to the capital for service or reward. The Emperor was a great patron of learning. He knew that "an empire founded on horsaback could not be governed on horseback". He, therefore, sought merit and ability wherever possible. He made considerable additions to the college at Ch'angan established by his father, who was himself a good scholar. It had a well-equipped library, and hundreads of students pursued their studies free there. In religion, Li Shih Min strengthened the confucian cult, though the family had Taoist predilections, as it claimed descent from Lao Tzū. The Emperor said: "Confucius is to the Chinese what water is to fishes". He decreed that the great Teacher be honoured in all the colleges of the Empire, and that a temple be erected to him in each of the *Chou* (prefecture) and *hesien* (subprefecture). Li Shih Miu showed toleration to all faiths. It is, however, doubtful if he himself belonged to any definite persuasion. Like Akbar, he often discussed the beliefs and practices of foreign people with envoys and merchants coming to Sian. He welcomed and listened to with respect the Nestorian (Unitarian) Christians, the Manicharans, and the Arab Moslems. In China itself there was the utmost freedom to follow Taoism or Buddhism or the ethical principles of Kung Fu Tzū (Confucius). Li Shih Miu allowed

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ideas to circulate freely, and he used to say that "truth does not always bear the same name". It was during his reign, in 629 A.D., that Yūan Chwang left China for India without taking the requisite permission for travel, but the Emperor overlooked this violation of the Law and asked the celebrated pilgrim on his return home in 645 A.D. with about 657 manuscripts to write a book on India, which is even today regarded as a mine of information by historians.

The criminal law of the realm was mild and humane as compared to that of the contemporary Byzantine empire, where crimes and vices were common, and mutilation of the limbs and other shockingly severe penalties were inflicted. Such punishments were not given in China, and Li Shih Miu further revised the code of laws. The capital sentence of the old sui code was modified into fine or imprisonment, and before ever confirming the death penaley the Emperor was expected to reflect on it and fast for three days. Incidentally, it reminds us of Aśoka's decree granting three days respite to persons condemned to death. Li Shih Miu believed that the honesty of officials and lessening the burden of taxation would be far more effective in stamping out robbery and violence than a rigorous system of penal laws. It is noteworthy that at the time of his death there were, according to official chronicles, only fifty men in prison and only two men under the death-sentence. He thought that the best policy was to reform the erring individuals in a gentle manner. Once he was informed that a relation of the Empress had taken bribes of bales of silk. The Emperor, however, did not proceed against, or degrade, him, but on the other hand sent him some fine pieces of silk from the Imperial stores explaining to his Counsellors that the sight of the articles would be a sufficient chastisement to the offender. Li Shih Miu lived a simple life, and his court was free from the taint of pomp and wasteful expenditure. "To rob the people", he said, "in order to satisfy the need of the sovereign is like cutting off one's own flesh to satisfy one's hunger". He had a paternal love for his subjects, and he always relied on their loyalty and goodwill. He declared: "I look upon the Empire as a father does on his household, and on all my subjects as my children. I compare their heart with my own; if I love them as a father does his children, how can I suspect them of wanting to harm me". Thus he had completely identified himself with his people. Another refreshing trait of the Emperor was that he never stifled criticisms of his deeds. He exhorted: "Never hide from me my faults; feel perfectly free to tell them to me". In fact, he set great value on public opinion, for, as he observed, "by using a mirror of brass you may see to adjust your

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hat; by using antiquity as a mirror you may learn to foresee the rise and fall of Empires, but by using men as a mirror you may see your own merits or demerits". Much of the success and liberality of his reign was due to the inspiration of his noble consort, Chang Sun, who was a model of simplicity, devotion and virtue. Thus under the benevolent rule of Li Shih Miu China was a happy and prosperous realm, and C. P. Fitzgerald rightly says that "he became far more famous as a wise and far-seeing administrator than he had been as a conquering hero" (*Son of Heaven*, p. 206). His name was known far and wide, and even foreign potentates cultivated his friendship and alliance. In 641 A.D. the great Harshavardhana of Kānyakubja sent to his court a Brahman envoy, who returned in 643 A.D. accompanied by a Chinese mission bearing a reply to the Indian monarch's despatch. In 640 A.D. an embassy from the Byzantine Emperor reached the Chinese court at Chàugan. The last Sassanian prince, Yezdegerd III, sought asylum there when he was driven out by the victorious Moslems. Even the all-conquering Caliphs, Omar and Othman, were eager to establish friendly relations with the mighty Chinese Emperor. Li Shih Miu was thus one of the greatest figures in Chinese history, and in forming an estimate of his career and achievements Wells Williams, the author of the *Middle Kingdom*, aptly remarks that he "compares favourably with Akbar, Marcus Aurelius, and K'ang Hsi; or with Charlemagne and Haroun al Rashid". When Li Shih Miu was gathered to the ancestors in 649 A.D., his grateful people honoured him with the appellation Tai Tsung or T'ang Tai Tsung (Great Ancestor T'ang), by which title he is commonly known in history.

His son and successor, Kao Tsung, ruled from A.D. 649 to 683, and during his long reign he too made some conquests. He was a fervent adherent of Buddhism, and he revived the elaborate and expensive ceremonies of *fing* and *shan*, which were begun by Han Wu Ti. Kao Tsung was, however, mostly under the thumb of a crafty and dominating woman named Wu Hou or Wu Tse T'ien. She has been described as "the greatest of China's Catherines", for she was a more ambitions and scheming female figure of Chinese history than Empress Lü of the Hau and Empress Dowager Tzü Hsi of the Ching or Manchu Dynasty. Wu Hou favoured Buddhism, and in her time Buddhist sculpture reached almost perfection. One of the memorable things she did was to throw open the civil service to women—thus in a way anticipating the modern feminist movement. The next notable T'ang monarch was Hsüan Tsung or Ming Huang, who ruled from 712 A.D. to 756. Under him the T'ang dynasty reached the aceme of its

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glory both politically and culturally. His military achievements are, however, dimmed by the cultural progress of his reign. He greatly honoured the memory of Confucius. He founded an institution for teaching music. In Ch'angan or Si-au, the capital, he established an academy called Han lin Yüan, the membership of which in course of centuries became a most coveted distinction. It assisted and advised the Emperor on matters relating to language and literature. His court was adorned by poets like Li Po and Tu Fu and by such painters as Han Kan, Wu Tao Tzü, Li Ssu-hsun, and Wang Wei. But this brilliance proved ephemeral, and soon the T'ang fortunes were on the downward path. The Emperor fell under the charm of a captivating beauty named Yang Kuei Fei, who led him into the morass of unbridled dissipation. Revolts occurred and the one under the leadership of An Su-shan, shook the empire to its very foundations. In the midst of strife, corruption and local banditry, the reigns of a few energetic sovereigns, particularly Hsien Tsung (806-20 A.D.) and Hsüng Tsung (847-60 A.D.), may be likened to the sunset glow on the western horizon. It is, no doubt, splendid, but is soon buried under the fall of darkness. So the T'ang power flickered on unsteadily until the extinguishing of its light became inevitable on account of the rise of frontier tribes, super-national insubordination, the machinations of eunuchs and concubines, luxury at court, and the unfortunate practice of invoking the aid of aliens to crush insurrections. It was clear that the T'ang had forfeited the mandate of heaven. At last in 907 A.D. the storm burst in all its destructive fury and Chu Wen, a lieutenant of the rebel Huang Ch'ao, deposed the weak T'ang ruler, and thus founded the later Liang dynasty.

Let us now briefly outline the cultural progress under the T'ang, who controlled the destinies of China for well-nigh three centuries. The re-unification of the country and internal security created the necessary atmosphere for all-round development, population increased rapidly, and according to the census, which is an old Chinese institution, it was about 42 millions in 726 A.D. Such a mass of humanity must have obviously carried on a good deal of trade, both domestic and foreign. Indeed, external trade got immense impetus largely due to the enterprise of foreign merchants. It passed through the Tarim river basin route in the north-west and the sea route in the south. As the latter was more popular, Canton rose in importance as a port winning the pride of position from the Tong King poets. Thither flocked Arabs, Persian and Indian merchants. We also hear of Nestorian Christians and Jews living in Canton in the ninth century. Chinese goods were freely in circulation in the bazaars of Baghdad. The

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chief commodities of export were silk, spices, porcelain and those of import were ivory, incense, copper, tortoise-shell and rhinoceros horn. The Arabs also brought negro slaves to China for sale. It is not clear what part of foreign trade was in Chinese hands, Tai Tsung is known to have issued an ukàse forbidding the Chinese to go abroad, and this perhaps indicates that some of them now and then crossed the blue waters in search of the golden girdle of the earth. Chinese pilgrims also went to India to collect Buddhist manuscripts and to visit the sites hallowed by the memory of the Buddha. This distinguished band included such ardent souls as Fa-hian, Yüan Chwang, I-tsing, Song-Yun, U-Kong. From India, too, there was a stream of Buddhist teachers ever since Buddhism was introduced into China. One of this line was Amoghavajra, who reached the celestial empire in the 8th century A.D. The contact between the Chinese and foreign peoples was fruitful in religious matters. The T'ang emperors were not only tolerant of alien creeds but sometimes even encouraged them. It was only on rare occasions that persecutions took place. During the reign of Tai Tsung China first came into touch with Christianity in the form of Nestorianism, which was brought there, according to an inscription of 781 A.D. unearthed at Hsian fu (Ch'angan) in 1625 A.D., by A-lo-pen of Ta-Chin in 635 A.D. Kao Tsung was also favourably inclined towards Christianity, which was known by the Chinese name of Ching Chiao, though the Church was first called Po Ssü Shih and then Ta Chin Shih after 745 A.D. New evangelisers appeared on the scene in the ninth century, and sometime before 823 A.D. a metropolitan was appointed for China and Churches sprang up in big cities. Besides Nestorians, Jacobite Christians also extended their missionary activities to China. The doctrines of Maṇi, known as Manichæism or Mani Chiao, came there, through Iranians, in the last decade of the seventh century. Islam was another foreign faith, whose followers existed in China under the T'ang. It is said that Prophet Muhammad despatched letters to three great rulers of his time—Heraclius (Byzantium—Eastern Roman Empire), Kavadh II (Ctesiphon—Persia), and Tai Tsung (Ch'angan). Heraclius did not pay any heed to the Prophet's communication, Kavadh II tore it to pieces, and Tai Tsung alone read it with the care and attention it deserved and allowed the Arabs to build a mosque in China at Canton. Islam thus entered China, and it prospered there until the persecutions of the Taoist Wu Tsung. It is known there under the name of Hin Hui Chiao. We also hear of Mazdaism (Zoroastrianism) and Judaism, but they were professed by foreign residents only. There was a special officer called Yao Cheng, who was charged with the duty of looking after the affairs of the Zoroastrians. It was Buddhism

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that flourished most, and the T'ang period has, therefore, been sometimes described as the Buddhist Age of the Middle Kingdom. It should not, however, be supposed that it had no detractors. Often it had to face opposition in high circles. For instance, Han Yü, a devout Confucianist, was strongly against Buddhist and Taoist superstitions. He raised his powerful voice against the spread of Buddhism in his "Memorial on Buddha's Bone", which he wrote on the occasion of the reception of the supposed finger-bone of the Buddha. Emperor Wu Tsung openly persecuted the Buddhists. Even Tai Tsung, Kao Tsung, and Hsüan Tsung attempted to restrict ordinations of Buddhist monks and nuns. Some of the T'ang rulers were themselves ardent Buddhists—the most notable among them being Wu Hou and Su Tsung, the successor of Hsüan Tsung. Indeed, the empress Wu Hou was regarded as Maitreya. The vitality of Buddhism was further evident from the multiplicity of sects like the Ch'an, the Fa-hsiang, the Hua-Yen, the Lü Tsung, and the Chen-Yen, which differed and widely too—in their beliefs and ritual observances. By the end of the T'ang period Buddhism had reached its highest watermark, and after that the tide began to ebb. The T'ang emperors, of course, paid due honour to Confucianism. As already mentioned, Tai Tsung commanded that every *Chou* and *hsien* should have a temple dedicated to Confucius. His images also were now installed after the Buddhist fashion. The T'ang did not neglect Buddhism either, Kao Tsu constructed a temple in memory of his "first ancestor", Lao Tzü, whom another emperor honoured by the Imperial title of Yüan Yüan Huang Ti. In the 8th century Hsüan Tsung was much attracted towards Taoism, and Lü Yen wrote a famous treatise on its ethical principles. Taoist priests were often granted certain privileges in matters of service and taxation.

The T'ang reformed the older calendar. In 684 A.D. the Kuang Chai calendar was officially approved and adopted. The revised form was the work of an Indian monk, who had been employed for the purpose by empress Wu Hou.

The T'ang monarchs encouraged education. The most important centre of learning was the capital, Ch'angan, itself, where flocked students, belonging to all ranks of society, from Tibet, Korea, Japan and other countries. The main subjects of study were the Confucian classics, history, arithmetic and law. Schools were established for medicine and calligraphy also. Examinations were held at regular intervals, and they afforded full opportunity to the man of humblest origin to rise high in the official hierarchy, for they were the only recognised agencies for recruitment to

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the services. They were divided into three classes as they were meant for the Degrees of (*a*) Hsin Ts'ai, (*b*) Ming Ching, and (*c*) Chin Shih. After the re-organisation of the examination system, one could take them in a variety of subjects. For instance, one was allowed to offer classics, calligraphy, mathematics or law for the Degree of Chin Shih. Tests were held for Taoist studies, and military exercises were prescribed for army examinations.

As regards literature, the output was considerable. Tu Yu was the author of a work on Constitutional history called *T'ung Tien* and Lü Chih-Chi produced the *Shih T'ung*, i.e., Comprehensive Study of History. The best representative prose writer of the day was Han Yu or Han Wen Kung (708-824 A.D.), in appreciation of whom Su Tung-po of the Sung dynasty says: "By his literary efforts the decay of sight dynasties was restored to its former glory". Han Yu made a departure from the highly artificial and ornate old style. He adopted a simple naturalistic style in his writings, which reflected the hopes, aspirations and general conditions of the struggling mass of Chinese humanity. Another advocate of the new natural prose style was Liu Tsung-Yüan. Short popular stories in prose now began to be written, and this gave rise to a vernacular literature. But what reached its highest pitch during the T'ang times was poetry. In his remarkable work entitled *Chinese Literature* Professor Giles observes: "The T'ang dynasty is usually associated in Chinese minds with much romance of love and war, with wealth, culture and refinement, with frivolity, extravagance and dissipation; but most of all with poetry". The "Complete collection of the Poetry of the T'ang dynasty", published in 1707, contains 48,900 poems of all kinds, which fill a number of large volumes. Besides rhyme and length of the line of the Han, stress was now laid on tone. Several T'ang emperors were themselves votaries of the Muses. Tai Tsung formed a select company of literary men for discussions, and its members were known as "Men of Paradise" Chung Tsung held at the capital a sort of a literary festival, which began every year on the fifteenth day of the first moon and lasted a full fortnight. It gave a good deal of fillip to the art of poetry, for every court official had to compose a poem in celebration of the event. Emperor Hsüan Tsung (Ming Huang) was himself an accomplished poet, and his "Pear Tree Garden" attracted musicians and men of talent from all parts of China. The most gifted poets of the age were Li Po (born between 699 and 705 A.D. and died in 762 A.D.) and Tu Fu (712-770 A.D.). The former was greatly honoured by emperor Hsüan Tsung (Ming Huang), whose love, the beautiful Yang Kwei Fei,

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was the subject of some of his inspired poems. But the favours and frowns of the high and mighty did not matter much to Li Po. He was fond of his poetry, his friends, and his cups. One day he was asleep in a tavern after taking an overdose of wine, when the Emperor sent a messenger immediately summoning him to the palace. "Tell the Emperor", said he, "that I am talking with the gods", and he went to sleep again. Li Po was called "the god in exile" by his intimate circle of admirers, "the Six Idlers of the Bamboo Grove", for he seemed to belong to a nobler world than this one. Other lesser poetic celebrites of the times were Po Chu-Yi (772-846 A.D.), Ch'en Tzü—an, Sung Chih-wen, Wang-Wei, Ch'ang Chien, T'ao Han, and Lin Tsung Yüan, whose compositions offered delight and solace to many a yearning heart.

Under the T'ang there was also an artistic outburst due to the patrongage of enlightened monarchs, the influence of Buddhism, and the interaction of diverse cultures and races. Painting attained a high level of excellence. It went hand in hand with calligraphy. Indeed, the Chinese style of painting appears to have developed from the writing. Their paintings are either long horizontal rolls or hanging serolls. They do not value portrait painting much. It is to the T'ang period that the earliest paintings in China can be ascribed with certainty. Those on silk, which were discovered in the caves at Tun-huang, throw considerable light on T'ang Buddhist paintings. Yen Li-te and his brother Yen Li-pen were masters in painting historical scenes and religious themes especially those relating to Buddhism and Taoism. The two greatest landscape painters were Wu Tao Tzü or Wu Tao Yüan and Li Ssu-hsun, who both adorned the court of emperor Hsüan Tsung (Ming Huang). They were the exponents of two divergent schools of painting, and each had his followers in later centuries. The one believed in depicting the spirit of a scene in strong, rapid and bold strokes, and the other thought that the more careful and attentive he was to the details the more life-like representation of Nature he would be able to produce. Wu Tao Tzü's frescoes on the walls of temples at Ch'angan and Loyang are certainly noteworthy. His friends, Wang Wei, was another good artist, who founded the school of black ink painting. His works were bolder and freer than those of the drier, though more minute, Northern school. Besides birds, insects, flowers, plants, mountains and rivers etc., which were the favourite subjects of the brush, the T'ang artists excelled in portraying aminals. One such was Han Kan, who was a well-known painter of horses.

As in painting so in sculpture the T'ang period reached rare heights of perfection. Often animals and scenes from human life were chiselled

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in conformity with the Han tradition. The T'ang images at Lung-men in Honan not only reveal beauty of style but also accuracy in detail. In Buddhist art, the *motifs* bore evidence of either Gandhāran or Gupta influence. There was doubtless grace in it but little of vigour. The secular art, represented by monoliths and wall carvings, shows naturalness and freedom from convention. The terracotta figurines display anatomical faithfulness, elegance, freshness and skill of a high order. Further, porcelain, which, it is believed, was intervented in the Han epoch, was now put to extensive use. The "three-coloured vessels" were most characteristic of the T'ang times; they had a white surface with green and yellow glazing for purposes of ornamentation. To these colours were sometimes added black and red thus producing "five coloured vessels". The principal places of porcelain industry were Hsing Chou in the North and Yueh Chou in the South.

Under the T'ang, printing was developed. A new method of transferring inscriptions on stone tablets by inking their surfaces and applying sheets of paper to them was discovered. The use of wood blocks was subsequently invented by one Feng Tao. After sometime block printing became popular in China, and this led to the spread of Confucianism and general education among the people. To turn from a consideration of the artistic progress to social life, unfortunately one feels handicapped by the paucity of information. It is well-known that tea was introduced during the T'ang period, and it soon became the most favourite beverage of the Chinese, Wine, specially "grape-wine", was another common drink. Poets were most addicted to it, and both Li Po and Tu Fu died as a result of excessive indulgence in it. On occasions of social gatherings music and dancing girls were the usual amusements. Dice, cards and chess, too, were played to break the monotony of existence.

The T'ang did not favour the long and loose robes worn during the Han period. They encouraged the Tartar style and leather boots. The colour of the garments had a significance in that it denoted the official rank. Women went out veiled, and they put Hsiai Pei as a mark of their marriage. The literary and official classes wore a special head-dress called Wu Shakuan.

Regarding the hard realities of economic life, it is recorded that the first T'ang emperor redistributed land and tried to equalise the holdings. Peasant proprietorship was a normal feature of the rural economy. The state constructed canals for the benefit of cultivators. When the land

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was ravaged by floods and famines, government gave relief by free distribution of food and remission of taxes. The burden of taxation was by no means, light, the main sources of revenue were land, salt and tea, customs duties began to be levied later. Forced labour was in vogue, Marts were established in the chief cities. The use of standard weights and measures was insisted upon. Copper was the ordinary currency for business transactions. The tendency of the people to melt copper for making images often led to cash famines. Accordingly, towards the close of the T'ang period an experiment was made in paper currency.

We have now finished our survey of the T'ang age. Its main features were territorial expansion and the political unification of China, the development of the examination system, and literary and artistic progress. Buddhism prospered and the people enjoyed the blessings of peace. The greatness of the T'ang culture is further evidenced by the fact that it profoundly affected the neighbouring countries like Korea, Japan, French Indo-China, Tibet and the New Dominion in the North West. In describing the glory that was China under the T'ang, Wells Williams says that it was then "probably the most civilized country on earth; the darkest days of the West, when Europe was wrapped in the ignorance and degradation of the Middle Ages, formed the brighest Era of the East". The achievements of the T'ang in peace and war, commerce and diplomacy, literature and art created a deep impression upon their people, and to this day the Southern Chinese call themselves "Sons of T'ang", just as other Chinese refer to themselves as Han Jen, "Sons of Han". Both the Han and T'ang periods were the golden ages of the celestial Empire, but the latter represented to a greater extent the predominant features of Chinese life and culture.

Two fathers of sons in College were comparing notes.

"My son's letters always send me to the dictionery", said one father.

"You're lucky", said the other. "My son's letters always send me to the bank".

During a Christmas examination one of the questions was, "What causes a depression?" One student wrote on his answer paper, "God knows! I don't. Merry Christmas!" The paper came back with the professor's remark: "God gets 100. You get zero. Happy New Year."

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THE EPIC

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"The epic is undoubtedly the greatest work
which the soul of man is capable to perform".

These words of Dryden are significant in as much as they bring out clearly not only the colossal labour involved in the composition of an epic, but also the lofty grandeur which is one of its distinguishing characteristics. The epic must be as far removed from familiarity as possible. No touch of banality should be permitted to disturb its sustained and dignified gravity. The word "epic", it is interesting to note, is derived from the Greek "epos", which simply means a story. This derivative or original meaning of the epic should be borne in mind: the heroic poem is invariably a narrative. The main interest, however, does not lie in the mere recital of events; for dramatic propriety and characterisation are equally important. The basis of the epic is laid round some momentous theme or action in the dim ages of the past, in which beliefs in all kinds of superstitions and divine agencies are generally prevalent. The supernatural element is, thus, one of the essential features of an epic poem. Whether it be derived from pagan antiquity or from Christian mythology is of little account. The one thing that is of supreme importance is that the supernatural element must be present in the composition of an epic poem in some form or other: it serves to confer upon the poem not only an atmosphere of remote dread and awe which is in keeping with the essential dignity of the epic, but also a spacious width of range by linking our narrow human world with the spiritual realms of ghosts, gods, and angels. It is not enough that the hero of an epic poem should be a man of marvellous strength, almost exceeding that of nature, but he must also be sufficiently imbedded in the traditional thoughts of men and women to excite their interest in his deeds. Further, the language in which his feats and adventures are celebrated must be in perfect harmony with his grand personality; it should be, in short, *sublime*, in which every word is of perceptible weight and proportion.

The action of an epic poem must also be one organic whole with a definite beginning, middle, and end. It is not to be a conglomeration of independent stories patched one upon another without any sense of unity. On the contrary, it should be, as Aristotle observes, "one and entire". This

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does not mean that all anecdotes other than the main story are to be rigidly excluded from the constitution of the epic. It means simply that whatever episodes may be introduced into it, they must not in any way assume an independent importance of their own, but should, on the other hand, be made to subserve the purposes of the principal fable or the main plot. The ecumenical or national aspect of the epic must also be clearly borne in mind. "Its basis and form", Hegel rightly remarks, "are determined by the totality of the beliefs and ideas of a people; and its subject is some past action which includes the whole life of a nation and the history of an epoch."

Having drawn attention to these features, we are now in a position to advance a rough, working definition of the epic, which, in the light of what has been said above, will be easily understood. The epic is an elaborate, organic, and dignified narrative poem, dealing with some momentous theme or action in which heroic characters and supernatural agencies play their interconnected parts under the control of a sovereign *destiny*. It is distinguished from an ordinary narrative poem by greater dignity of style, cohesion of plot, and symmetry of structure. It differs from a drama in as much as it does not preclude the occasional play of the subjective element. And it is distinguished from the lyric not only by its greater length and magnitude, but also by making the narration of action rather than the expression of emotion its predominant feature. In the "English Epic and Heroic Poetry", *Channels of English Literature* series, Professor Macneile Dixon defines the epic thus:

"The true epic, whereever created, will be a narrative poem, organic in structure, dealing with great actions and great characters, in a style commensurate with the lordliness of its theme, which tends to idealise these characters and actions and to sustain and embellish its subject by means of episode and amplification".

The epic deals with the past, the lyric with the present. The epic is based on what has happened or on what men believe to have happened. It is based, in other words, on history, legends, and myths, and it must, therefore, solely depend on memory and imagination. There is little invention, for the fate and story of the hero are generally well known, and the poet's skill lies only in presenting the story with force and freshness. The epic is objective. It deals with events. The lyric is subjective; it deals with the poet's inner world of hopes, fears, and desires. The epic moves with a slow, solemn, and majestic rhythm; it flows with a broad and quiet current. But the lyric is condensed, concentrated, and intense.

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It is like a fountain springing up suddenly at your feet. The epic is written in a traditional, uniform metre, such as the Greek hexameter, the heroic couplet, or blank verse. The lyric may be written in any form; it may even invent a new form. The epic was chanted and the lyric was sung. A few of the minor characteristics of the epic are: firstly, its love of episodes which, though apparently unnecessay to the main plot, are essentially connected with some part of the action. The story of the destruction of Troy in the *Aeneid* is an admirable example of the episode. Secondly, its love of repetition—the repetition of wholesale phrases and sentences necessitated by the poet's need for rest in a long argument. Thirdly, its love of sustained similes and allusions by means of which the poet is able to incorporate the whole wealth of nature and of human learning into the texture of the epic. Fourthly, its love of dramatic dialogues which enable the poet to impart to the story a considerable element of charm and liveliness.

From the historical point of view the epic may be divided into two varieties, the epic of growth, and the epic of art. The former is not in its entirety the work of a single author, but is to some extent the result of a process of evolution and consolidation; and a large amount of preexisting material, in the shape of legends, folk-poems, and sagas, is gathered up into its composition. Its well-known examples are to be found in the Anglo-Saxon *Beowulf*, the old Germanic *Nibelungenlied*, and the Finnish *Kalevela*. The *Iliad* and the *Odyssey*, in spite of their unmistakable evidence of the controlling power of a single supreme artistic genius, may also be said to belong to the category of the epic of-growth, since their genesis and early history are clearly traceable.

The epic of art is the product of individual genius working in an age of scholarship and literary culture on lines already laid down. Its specifically literary qualities, its skilful adaptation and reproduction of epic matter and methods, its reminiscences, its echoes, and borrowings are indeed among its most interesting characteristics for a cultured reader. While, therefore, the epic of growth is fresh, spontaneous, and racy; the epic of art is learned, antiquarian, bookish, and imitative. Virgil's *Aeneid*, Milton's *Paradise Lost*, Tasso's *Gerusalemme Liberata*, Camoens' *Lusiad*, and, on a smaller scale, Arnold's *Sohrab and Rustam* are the well-known examples of the later epic or the epic of art.

A third variety of the epic may just be mentioned, the Mock Epic, in which the machinery and conventions of the regular epic are employed in connection with trivial themes, and thus turned to the purposes of

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burlesque or parody. Homer's *Battle of the Frogs and Mice*, Bulter's *Hudibras*, Boileau's *Lutrin*, and Pope's *The Rape of the Lock* are the best-known specimens of this variety of the epic.

In modern times the epic is so rare a production that it may almost be said to have disappeared. The causes of this decline of the epic are not far to seek. Firstly, the national spirit of the older crude type necessarily decays with the advance of civilisation. The remarkable development of the subjective spirit in modern times is also antagonistic to the interests of the epic, the dominant feature of which, as has already been mentioned, is the narration of action rather than the expression of emotion. Thirdly, the huge dimensions of the epic render it unfit for the more concentrated expression of an age when literature is abundant, and when the recital of poetry has given way to rapid reading. Finally, the enormous development of prose fiction in modern times satisfies the instinct for story to which the epic formerly administered, and poetry has turned more and more to the satisfaction of needs which cannot be met adequately in prose.

It is a pity that the epic poem is doomed, since with its death, as Professor Bradley rightly observes, "something of inestimable worth will perish". But we may, perhaps, take some comfort to ourselves by recalling the wonderful powers of revival and renewal inherent in all true poetry. The epic may well be akin to that lovely and marvellous bird, the phoenix, which burns itself on the pyre, but out of its own ashes springs anew—

"More beauteous and more potent than before".

A Boy looking for something to do saw the sign "Boy Wanted" hanging outside a store. He picked up the sign and walked in.

The proprietor met him. "What did you bring that sign in here for ?"

"You won't need it any more", said the boy cheerfully. "I am going to take the job".

Lawyer: "Now that we have won, will you tell me confidentially if you stole the money ?

Client: "Well, after hearing you talk in Court yesterday, I am beginning to think I didn't".

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THE PROBLEM OF RACE-COMPLEX IN THE POPULATION OF ANCIENT INDIA

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Present Racial Mixture.

It is obvious that in the population of India there is a mixture of various human stocks. Complexion from fair to black, features of various shapes, stature from tall to dwarfish, nose from long, prominent and aquiline to broad and flat, eyes from elongated and prominent to oblique and narrow, skulls of various dimensions and hairs from straight and soft to curly thick and stiff have all mingled in various proportions in different parts of India, though in those parts predominent human types are still discernible.

Simple Explanation.

India is a vast country stretching from 6 to 38 latitude N. and from 66 to 100 longitude E. It possesses clearly marked geographical regions with different climatic conditions, landscapes, soils, vegetation and environment. Broadly speaking, these regions are :—(1) Northern India embracing the Himalayas and their ranges in the north, north-east and north-west, (2) the Vindhya Ranges (3) the Deccan and (4) the South. In these regions of India originally regional and ethnic communities evolved with their peculiarities and they were sharply marked from each other except on the borders of these regions. In the course of a long time these regional and ethnic communities intermingled through the following processes :—(i) Racial and tribal migrations, (ii) Colonization, (iii) Conquests, (iv) Trade and Commerce, (v) Social intercourse, e.g., marriage etc. and (vi) Religious intercourse, e.g., pilgrimage, etc. To this internal intermingling within the boundaries of India can be added the external human elements which were deposited in the Indian population by foreign invaders like the Iranians, the Greeks, the Scythians, the Kuṣaṇas and the Hūṇas through the course of their invasions and settlements and which were assimilated in the Indian communities later on.

Modern European Scholarship.

The history of modern European scholarship regarding the problem of racial complex in the population of India has passed through various stages and is, psychologically, very interesting. Its successive stages and phases can be stated as follows :

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(i) On a broad analysis there are two main types of races in India—(1) the Aryans and (2) the Non-Aryans. The Aryans were foreigners originally living either in Central Asia or Europe, who invaded India in c. 1500 B.C. Before the Aryans entered India the whole of it was occupied by the Dravidians, the Austrics etc., who were the aborigines of the land. The Aryans invading from the N.W. drove the pre-Aryan population towards south and east and chased them to mountains and forests.

(ii) In the second round of racial studies in India it was revealed to the European scholars that not only the Aryans but also the Dravidians were foreign to India, who migrated to this country in some very remote past earlier than the Aryan invasion of India from the Mediterranean regions and who lost their fair complexion in the hot climate of India. The latter like the former drove on and suppressed the pre-Dravidian population.

(iii) In a still later study of the racial problems of India it became clear to the European ethnologists that together with the Aryans and the Dravidians even the Austrics are not antochthonous to India and they too migrated from some western country to India earlier than the Dravidian migration to this land.

(iv) The latest view of the European scholars is that India was a human vacuum in the beginning.[1] The various elements in the Indian population came from outside, one pushing the other onward to the south and the east. Amongst the ancients the Aryans were last to invade India. The later invaders of India the Iranians, the Greeks, the Śakas, the Parthians, the Kuṣaṇas and the Hūnas added mainly the Aryan elements to the Indian population, the last being of Mongoloid extraction, though tinctured with Aryan blood through the course of their expansion.

The latest Analysis of Indian Population.

Dr. B. S. Guha, Director of Anthropological Survey of India, in general agreement with Dr. Hutton, has analysed the racial elements in Indian population as follows[2]:

(1) *The Negritos.* They were brachycephalic people from Africa who arrived first in India. This race was suppressed and

1 Dr. J. H. Hutton: The Census of India, 1931 Vol. I, pp. 424 ft.
2 The Census of India, 1931, Vol. I, Part III.

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absorbed by later immigrants, specially the Proto-Australoids. At present it survives in the Andaman Island, in Malaya, among the Kadars and Palayans of Cochin and the Travancore Hills, the Irulas of Wynad, the Angami Nagas of Assam and some of the Rajmahal Hill tribes of Eastern Bihar.

(2) *The Proto-Australoids.* They were black, dolicocephalic, platyrrhine, who came from the eastern coast of the Mediterranean (Palestine). They are represented in a number of tribes of the Vindhya ranges, though mixed with other racial stocks. One of the branches of Australoids, in every ancient times, passed on to Australia and gave rise to the Austranesian peoples.

(3) *The Mongoloids.* They are divided into (1) Palaeo-Mongoloids (long-headed and broad-headed) and (2) Tibeto-Mongoloids. They came from China and Tibet and influenced the population of S.E. Bengal, Assam and the southern slopes of the Himalayas.

(4) *The Mediterraneans.* They comprised three subtypes—Palaeo-Mediterranean, Mediterranean and Oriental—and came to India from the Mediterranean regions. They were of medium stature, dark complexion and light build. From them originated the peoples of the Kannada, Tamil and Malayalam tracts, the pre-Aryan Dravidians of Northern India and some communities of the Punjab, Sind, Rajputana and Western U.P., which are marked by a longish nose and fair skin.

(5) *The Western Brachycephals.* They included (1) the Alpinoid, the Dinaric and the Armenoid subtypes of people. From the third descended some of the Dravidian tribes of northern India. The first two gave rise to the pre-Vedic Aryans and the Vedic Aryans respectively.

Criticism of the Analysis.

The above analysis of racial elements in Indian population presupposes that India was an empty space so far as human beings were concerned. As a matter of fact there are no evidences in support of such a supposition. Moreover, there are no records literary or traditional regarding the immigration of the above-mentioned peoples to India. Not even anthropological and linguistic evidences can be suggested in favour of their migration to India, except in case of the Aryans whose language contains some words

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common with the European languages and whose complexion is fair. The evidence of the Brahui dialect in Baluchistan on the problem of the Dravidian migration from the west to the east is rather in favour of their migration in just an opposite direction, unless a Dravidian base is discovered in Western Asia or Europe, which so far has not been done nor there seems to be any possibility of it. The philological arguments urged in favour of the Aryan invasion of India from the West are highly complicated and speculative and they can be offered with an equal force in favour of the westward expansion of the Aryans from Northern India. Besides, it is absolutely unnecessary to confuse the (Indo-Aryans) with the Europeans racially on the meagre evidence of remote linguistic affinities. Simply because some known types of human beings live in different parts of the world, it does not justify the theory that the resembling types of human beings in India came from those parts of the world, specially in view of the fact that India from Cape Camorin to Kashmir contains different geographical regions with different climatic conditions and could originally produce those types without waiting for immigration from foreign lands, though it is quite true that during historical period she received some ethnic elements from outside.

The Proper Approach.

A straight and simple question should be: Could India provide facilities for the appearance of man on her soil? The answer is: Yes. It is held by competent geologists that among the fossils of the Sewalik Hills, extending for two hundred miles from Hardwar towards north-west, have been found the remains of Dryopithaeus, the Sivopithecus and the Palaeopithecus, which were the immediate predecessors of man.* A prominent geologist Joseph Barrel† suggested that during the uplift of the Himalayas at the end of the Miocene and the beginning of Pliocene ages the primitive man appeared on the soil of India. Similarly, it has also been maintained that South India, which constituted the heart of ancient Gondwana, was one of the original birth-places of mankind.‡ In the opinion of Sir Harry Johnston§ India was most probably the land where the evolution of man took place. It is rather surprising that the analysts of the racial elements in Indian population have altogether ignored the capacity of India for producing various human types, the fusion of which led to the racial complex in this country.

* Dr. Pilgrim, Panchanan Mitra's Pre-historic India, pp. 110-14.
† The Records of the Geological Survey for 1915.
‡ P. T. Srinivas Aiyangar, Sir Subramanya Lecture, 1926, p. 3.
§ The Opening up of Africa, p. 10.

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Indian Traditions regarding Various Human Types in Ancient India.

According to the Indian traditions recorded in the Purāṇas and the Epics the following human types were found in different parts of India:

(1) *The Āryas.* In the part of India known as Āryāvarta (Northern India between the Himalayas and the Vindhyas) arose the Aryan type of human beings. The Aryans were fair in complexion (not white like the Europeans), fairly tall in stature and good looking in features. In the North-Western part of Āryāvarta the Aryan type included the Asuras, the Daityas and the Dānavas, who were culturally, and not racially, different from the Āryas. There was a conflict between the Āryas and these peoples. The major portion of them, ultimately migrated towards western Asia. The Aryas partially resemble the Alpinos and the Nordics of Europe in complexion, as it was natural in a people born in the temperate climate of northern India. The Aryan languages and the European languages possess some common words. It can be accounted for by the facts of the early linguistic development of the Āryas, the migration of their branches to Western Asia and to the Mediterranean regions and the spread of the Sanskritic words from the Mediterranean regions to the different parts of Europe. The fairness of complexion and the existence of some common words do not prove the descent of the Āryas from the Europeans, nor do they in any way support the Aryan migration to India from Central Asia.

(2) *The Kirātas.* On the border of Āryāvarta towards N.E. lived the Kirātas, who included the Kinnaras, the Kimpuruṣas and, perhaps, the Gandharvas. They were yellowish in complexion, short but thick in stature, possessed flat face with scanty hairs on it. The faces and dresses of both the sexes among them were so similar that it became difficult to discriminate between the two. So the names Kimpuruṣa and Kinnara, which literally mean: 'Is he a man? Being on the border of China, they naturally resembled the Mongoloids.

(3) *The Śābaras.* This type arose in the Vindhya ranges, stretching from the Satpura to the Chotanagpur Hills and further beyond to the south and north-east of it. It included the present tribes of the Bhilas, the Gonds, the Mundas, the Santhals etc. As the very name 'Śābara (derived from *Śabari*—night,

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e.g., Darkness) suggests, they were dark in complexion and short in stature. They resembled the Australoids. Their extension can be found among the Austronesians, but no trace of them is discovered in Western Asia.

(4) *The Vānaras and the Ṛkṣas.** The original peoples of the lower Deccan and the South are known to the Purāṇas and the epics as the Vānaras and the Ṛkṣas, perhaps due to the fact that they had a Vānara (monkey) and a Ṛkṣa (bear) respectively as their totems. Their survivers can be found in many mountain and forest tribes of these areas. To some extent they resembled the Negritos, but it does not mean that they migrated to India from Africa; the resemblance was due to similar climatic conditions prevailing in the east Africa and the South.

It should be observed here that the term 'Dravida or Dravidian' used for the people of the south is relatively of a recent origin. It was for the first time used by Dr. Caldwell† to denote the South Indian peoples, speaking Tamil, Telgu, Kanarese, Malayalam and other allied languages. This term was never used in the sense of a race. The so-called Dravidians of the South are a mixed people containing Aryan, Śābara and Vānara-Ṛkṣa elements. In the Vindhya ranges, the Deccan and the South a number of mixed races, e.g., the Nisādhas, the Pulindas, the Andhras etc. came into existence in course of time and they were known much earlier than the Dravidians in Indian literature.

The Fusion of Races in India.

As already remarked the various races in India mingled together due to racial and tribal migration, colonization, conquests, trade and commerce, social intercourse, e.g., marriage etc. and religious intercourse, e.g., pilgrimage etc. during the long past. The fusion of races was so close by the age of the composition of the Mahābhārata that it was difficult to distinguish the one pure race from the other and the mixed population was regarded as of one human family. In the Nahuṣopākhyāna Yudhiṣṭhira said to the Yakṣa in the form of a serpent: "O Great Serpent of high talent, the word 'Jāti' (race) can be used here only in the sense of 'Manuṣyatva' (humanity). It is my considered opinion that a pure race is difficult to recognise due to the mixture of all the Varṇās (e.g. peoples

* There were some Rākṣas (Cannibals) also, who infested the forests of the south and had their basis in the islands of the Indian Ocean.

† Comparative Grammar of the Dravidian Languages, pp. 6-11.

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having different complexions). The males of all the races have been procreating progeny on the females of all the races. Under the circumstances, those who know the reality of things regard good conduct only of moment".*

The later arrivals of the Iranians, the Greeks, the Parthians, the Śakas, the Kuṣanas and the Hūṇas in India did not change the texture of the ancient Indian population, firstly, because their number was very small in comparison with the ocean of Indian humanity and, secondly, in Northern India they could easily be assimilated in their corresponding communities. The consciousness of race in India, owing to the process of fusion, was almost dead and it was surviving unconsciously in the forms of certain customs and usages. It has very recently been revived by modern linguistic and ethnic theories and speculations and encouraged by political considerations.

A Reorientation Needed.

So far the problem of the racial complex in the population of ancient India has been studied with reference to the known human types outside India during the course of European expansion in modern times under the psychological impact that Europe is the origin and centre of all forces, including the human force. The problem, however, requires to be studied in the light of Indian geology and geography, linguistics and ethnology and literary and historical traditions, of course, without any prejudice to any real affinity with outside, wherever it can throw correct light on the problem.

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*जातिरत्र महासर्प मनुष्यत्वे महामते । संकरत्वात् सर्ववर्णानां दुष्परीक्ष्येति मे मतिः ॥
सर्वे सर्वास्वपत्यानि जनयन्ति सदा नराः। तस्माच्छीलं प्रधानेष्टं विदुर्ये तत्त्वदर्शिनः ॥
—Mahābhārata, Vana. Chap. 180.

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A CASE-STUDY OF A MENTAL PATIENT

Shri S. K. D. Pande

[The Science of Psychology is passing through an ideological crisis. There are two lines of forces drawing it in opposite directions and no wonder psychology has not made any headway for the past quarter of a century. We see on the one hand, new physical concepts and physiological explanations are being presented and on the other hand its past affliations are proving to be a drag. In this case study the science of psychology is introduced as a patient suffering from a deep melody and in which we see the adolescent struggle of 'psychology' whose lifelong overprotection by a mother, had given little opportunity for the development of adequate role-taking skill in any but a dependent relation.

If psychology is to occupy its rightful place along with its sibling sciences, if she is to play its skillful role in the understanding and advancement of human relations which is the dire need of the day, the author suggests a way out and he will be amply rewarded if the urgency of the appeal he makes through this case study, is appreciated by the readers.]

* * * * * * *

Name: Says so many that by now forgot all.

Age: Not very certain but says a few centuries old.

Relations: An extremely affectionate mother and the patient says that he had a father too, but then does not seem to have any clear idea of him; sometimes he calls him 'brother' and sometimes 'father'. On being asked about the whereabouts of the 'father-brother' person, he complainingly says that the mother was harsh and ill-treated him and so he had to leave.

Mother's version of the incident: 'That dirty person was teaching the child dirty habits'. On being asked to elucidate her remark, she simply blushed.....

Disease: Seems to be a case of Infinite Regression almost to the embryonic stage.

First Interview

The patient has lost all contact with reality; he is not even certain about his name. Says, "name! name!! How many names do you

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want? I had them in hundreds". Then the patient falls into a delirium state and blurts, "Soul—mind—consciousness—brassinstruments—behaviour—animals—white-rat.....independence.....oh mother.....very dear mother".

At this it was suspected that the presence of the mother was hindering the work of analysis; she was requested to be away from the patient for sometime. First she protested saying "he is my last and the only child left with me now; all his elders have deserted; now with what cheeks you ask me to leave—no, to lose him?—my dear child" and she burst into tears.

[Here the first interview terminates and the patient and the mother were asked to come to the clinic after a week.]

Second Interview

The patient appeared calm and quite and was even prepared to talk. It was thought desirable to give 'word-association' test. A few of the significant associations are given below.

Father.....Brother.
Brother... . Physiology.

At this the patient desired to give more than one associations and he was permitted.

Physics, Chemistry, Statistics.
Mother.....Philosophy, harsh, cruel, loving, old.....

Then a few words were picked up from the patients own earlier talk at the first interview and their associations are given below.

Soul—Aristotle.
Mind—Alexander-Bain, Aberdeen-Logic, chair.
Consciousness—William James.
Instrument—Brass, Wundt, Titchner,.....
Behaviour—McDougall, Watson.
Research—filthy, son of magic.

At the word—Rat—the patient first smiled and said, "white-rat..... Tolman, Skinner", and then turned violent and his ideas became bizarre and unintelligible....."Rat—yes, my playmates, I will play, play, but mother killed them, killed, killed.....my mother my loving-harsh mother—affectionate.....cruel.....my brothers.....freedom.....life.....more life..."

At this the interview had to be terminated as the patient became unmanageable.

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THIRD INTERVIEW

The patient came alone as his mother was unwell. He looked cheerful and better. This time a free-association method was tried and the patient was asked to go back to his past—as far back as he can and relate everything that comes into his mind. This time precaution was taken lest the patient should become violent and unmanageable; a hypnotic sedative—Lunegeon—was kept ready to be injected intravenously if he showed signs of intense internal conflict and thus a long uninterrupted free associations was made possible.

The patient started with his childhood memories: "Yes. I feel I am in Leipzig at Germany, in front of the old fatherly bearded Wundt, philosopher by nature and physiologist by circumstance. I also remember of old-old Fechner, oriental both by looks and temperament, a first rate physicist turned into a second rate philosopher, the inventor of experimental philosophy of the body-mind problem. But returning back to Wundt, oh, what a creative synthesizer! He took 'nervous system' from the physiologist, 'vision and audition' from Helmholtz, 'psycho-physics' and 'weber's law' from Fechner, 'reaction experiment' from the astronomers, 'associationism' from the British—physiological philosophers. He bound them all together with the rope of his systematic logic, put the whole bundle on my shoulders and wished me God speed! I was wandering in search of a stable and cogenial home, for my mother alone would not make a home complete.

I began to do things for myself but only when my mother permitted me. The problems of space-perception continued. Ebbinghans experimentalised memory.....cutaneous sensations joined the other sense departments. Optical illusions enjoyed a most unusual popularity, and feeling too became the object of experimental work under the conservative and conventional Titchner who flattened out its tri-dimensional solid figure into a linear dimension. Külpe brought 'thought' into the laboratory. But no attempts to experimentalise me succeeded. Oh my mother! She would never leave me.

At this the patient showed some sign of onsetting disturbance and the sedative was administered and the patient felt somewhat sleepy but continued:

Now, I find myself in America. Here I find a freer atmosphere—the German tradition blended with imported Darwinism gave me a new name—

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functional psychology—and nurtured by practical minded James & Dervey, Angell, Stanley Hall, Cattell and others. They dealt with life and believed in the adaptive value of mind against the enviroment.....It was only here that I was allowed to play with animals—nice little animals, apes, cats, but the finest and most loving of them were tiny white-rats. They amused me very much. But my mother would not like me playing with them. They would go and trouble her, eat away her skirt; when she liked to fondle me, they would strom her lap and climb on her. At this she would push me away and frighten my nice little play mates (The patient got excited at this point). In the animal laboratory of U.S.A., it became clear to me that I could no more put up with my mother—my hostile mother. She loves me and hates me. She killed my white-rats Mother! How long!! Life! Independence!

Finding that the patient was getting unmanageable, we administered 3. c. c. of Lunegon which sent him to sleep and after fifteen minutes, he opened his eyes in a semi-hypnoidal state and we continued the analysis further. The patient started:

It is the twentieth century. Gains of 19th century were consolidated. Laboratories were springing up all over the continent and U.S.A. A general reaction against sensationism and elementarism was brewing up and it actually blew up the Wundtian tradition at Berlin. The leader of this Coup-de-tat was Max Wertheimer. Stroboscopic movement was recognised as ϕ-phenomena and I was ushered into the field. The flames of this rebellion were carried to Amercia by the two young enthusiasts Kurt Koffka and Wolfgang Köhler. The strains and stresses and the dynamic interaction between behavioral and geographic fields were fascinating sights. Under the stresses and storms of interacting forces, I underwent a complete metamorphosis and was restructured by the field forces into the most perfect, good, and pregnant configuration. The law of closure worked well. Here I had greater freedom. I was introduced to my eldest brother physics who long deserted my mother and so I had no occassion to meet him earlier. With him, I spent my happy days. I well remember vividly the University of Lowa and its essentially human Jewish personality of Kurt Lewin. His new concepts of life-space, of tension systems, of valences or force fields, of barriers and of structuraisation gave me a new life. His works on 'Group dynamics', 'Action researches' and his essentialy a-historical approach will forever show path to future scientists amidst this darkness of ideological confusion. He tore away my old clothes, awefully smelling of Aristotelian way of thinking and presented me new garments of Galelian mode of thought.

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For the first time I inhaled and exhaled free air in a happy life space. But alas that cruel year—1947 when I lost my master, Oh !! (The patient fell unconscious and this time a little glucose was given; after 20 minutes he opened his eyes and began).

But now where am I ? Who has brought me here ? It is an oriental place no doubt, an ancient seat of learning. I see I am accommodated in a big room of laboratory with few brass instruments and within the comfortable reach of my mother's long long arms. Without any traditional associates, cats, rats, dogs, and apes, I am asked to indulge in endless introspection. Forced to put up with strange bed fellows like telepathy, parapsychology, I am not even allowed to cross the street to meet my siblings physics and physiology (The patient is thrown into ecstasy) Oh ! creator !! Shalt thou ask to go back into my mother's womb !! Alright I shall do that. I am an embryo hanging by an umbilical cord !!! (The patient assumes a fetal posture and closing his eyes becomes completely insensitive to outside enviornment).

Here the case study terminates.

The Doctors Report

The case is one of infantile regression to fetal stage, complicated by pernicious anemia. He needs to be separated from his mother philosophy. Re-education with the help of modern literature and acquaintance with recent researches will help the multiplication of new red-corpusles. Later on, complete rehabilitation in a new enviornment on par with his elder brothers will cure his inferiority feeling and will bring back in him the confidence to face light-problems anew.

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INDIAN ECONOMY THROUGH TOTAL WAR
AN ECONOMIC ANALYSIS

Professor T. N. Ramaswamy.

Prior to the outbreak of the Total War in 1939, the economic system of our country had been, more by accident than by design, twisted out of the traditional framework of economic adjustments in which it has been encased for centuries anterior to British Rule. The Nineteenth Century had witnessed a phenomenal transformation in the economic systems of the other countries of the world, while it had created in India an economic transition which Sir Theodore Morison observed early in the present century, which had disintegrated the pattern of old cultural incentives to material progress but had failed to set up new scales of progress which could have helped India to find her economic destiny in the new world that was being created on the foundations laid by the Industrial Revolution. The result was the sinister shadow of economic distress that had descended on the country in the last quarter of the Nineteenth century showed no signs of lifting late in the third decade of the present century, when India was forced into the agony of economic adjustment imposed by mobilisation for a total war.

It is needless to stress that the economic transition which caught this country in its powerful grip in the 19th century failed to create any sort of adjustment between the prcoesses of economic change in our country and the revolutionary changes that were occuring in the economic structures of the other countries of the world. It only left us the dubious heritage of a "civilisation which failed to seek its balance with the New Century processes of economic and cultural adjustment, creating the morbid spectacle of *arrested economic development* and *cultural medievalism*".*

For over one hundred and fifty years before the outbreak of the recent War of 1939-45, our economic system had suffered not only from permanent 'economic dislocations'† but also from the consequences that arise from lack of any kind of synchronisation between the main trends of economic and cultural advance of our country and the rest of the world. At a time when the other countries of the world were loaded with "institutional set-

* Cf. Dr. Vera Anstey, Economic Development of India, p. 5 et seq.

† Badre's observations. Supplement to U.N.O. Economic Report, February and March, 1948, p. 21.

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ups which tended more and more to choke and paralyse the price-mechanism"*, our country was groaning under the weight cultural and economic institutions which had been frozen by the Midas touch of the price-mechanism which had failed to regenerate the economic system of an ancient country. Two factors can be held to be respensible for fossilising the economic civilisation of our country and for multiplying the forces of cultural and social friction, which served to complicate the problem of balance between India and the rest of the world: (*a*) the absence of an overwhelming economic incentive which could have smoothened the processes of economic evolution and created an economic conjuncture which could have mobilised the material and manpower resources to create the fabric of an adequate economic civilisation; (*b*) the impact of an impervious price-mechanism on an essentially subsistence type of economic administration which only served to freeze the mechanism of economic adjustments, creating serious 'dislocations' in the utilisation of our material resources and left us the legacy of stagnant agriculture, stereotyped industrial system, liquid labour markets, frozen transport rigid wage and income formations and a highly sensitive structure of foreign trade—all of which failed to alleviate, in any appreciable measure the giant problems of poverty and social stagnation for the people of our country.

In September, 1939, when India had to mobilise her resources in materials and manpower for total war and become what an unofficial publication called "the arsenal of the democracies in the East",† India's economic system was not in a position to bear the economic weight of the responsibilities which she was called upon to face. Her war potential was negligible. "A nation's real war potential", we learn from Klein, "is limited by two factors; the total amount of production which can be obtained from its resources, and the share of this output which can be converted into war purposes".‡

At the time of the outbreak of war, India's economic position can be summed up as follows. India was a vast subcontinent of 500,000 villages. These vast rural areas were unconnected by metalled road or railway. In the rural areas, except in the few that clustered round the distributing centres, there was hardly any agricultural production in excess of local demand. The corporate pattern of life in the villages had been punctured, in several places, by the intrusion of individualist forces of cultural advance.

* Ibid. p. 21.

† Vide Indian Year Book 1945-46, p. 487.

‡ American Economic Review, March, 1948, p. 73.

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The methods of production, both in agriculture and in industry, over the majority of the rural areas, were antiquated and obsolete. Rural markets were sluggish, unorganised and dominated by sinister forces of exploitation of the unprotected small producer which abound in a subsistence economy. Price-movements were sticky and heavily distorted by perverse time-preferecne ratios of subsistence farming, and the fitful velocity of circulation of money which had suffered from "seasonal stringency".* The frame-work of subsistence economy remained unassailed by the equilibrating forces of the pricing mechanism. Agricultural production schedules were dominated by abnormal resistances and heavy distortion of liquidity preference ratios of segregated rural communities. In the distributing centres of the country, older industrial units were burdened with uneconomic location rigidities. Industrial costs were frozen. Wage-formations, determined by considerations of maintaining industrial cost-structures competitive, failed to stabilise labour-flows in a market in which as the Royal Commission on Labour observes, 'labour has to be pushed not pulled' into the industrial areas. The markets for industrial goods were nebulous and shifting. Internal markets were highly unsteady in view of the uncertainty of agricultural incomes and foreign markets were uncertain in view of the enormous competition which developed from the newer countries. The composition of national markets for industrial goods could hardly diversify the industrial structure of the country and had long kept it *stereotyped*. Enormous rigidities had developed in industrial cost-formations. The transport system had come to be, since its genesis in the middle of the 19th century, an uncoordinated limb of the economic system of the sub-continent and, in the few years before the recent war, had been the victim of a ruthless *rail vs road* competition. India did not possess a sufficient structure of capital good and intermediate goods industries to sustin the strain of increase of production during abnormal periods of choking up of normal international trade channels for industrial and transport equipment. Her money-market had hardly spread beyond the few distributing centres and being more atomistic than organic, exerted enormous pressure on the pricing mechanism on the one hand and on the monetary preference ratios of the rural population on the other.

Such was the heritage of economic incorrigibles with which India had to mobilise for a total war in 1939!

India's economic system, at the outbreak of War, presented the pathetic spectacle of a "rustic multicoloured economic wagon filled with

* Cf. Wadia and Joshi Money and the Money Market in India.

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apples and hitched to the giant war-machine of the United Nations...merrily bumping along the 'unjeepable' terrain of total war"* Those who understood the basic economic dificiencies of our country understood too well the enormous cost in economic dislocations which we would have suffered by treading the path of war, burdened as the country was with a sluggish and clumsy economic system which had been created by the morbid clash of conflicting economic civilisations in the last two centuries of her historical evolution.

In such a setting, the task of assessing the magnitude of the problem of adjustment becomes morbid. If the country had been left to decide the issue of entry into war, she would certainly have stayed neutral like the small mountain nation of Switzerland. That is why Mahatma Gandhi who understood the basic economic and cultural deficiencies of the country was a confirmed apostle of the creed of nonviolence even to the point of exasperation. Subsistence economy with a war potential almost negligible cannot stand the enormous economic dislocations which the impact of war would necessarily generate. As Dr. Scacht might have put it, "The danger of such a development is imminent"† and the cost of dislocations too heavy for the country to with-stand

Several factors peculiar to the political set up of the country made mobilisation for war inevitable. The economic difficulties of the our country were further magnified as a result of the uncertainty that prevailed regarding the duration of war and the time-structure of the economic dislocations for which provision had to be made. Naturally as the war progressed and intensified the processes of economic change necessitated by mobilisation for war, a phenomenal transformation took place in the functioning of subsistence economy of our country. The sluggish forces of subsistence economy opened up unbridgeable gaps in all departments of economic life in production, in consumption, in transport and in interspatial and distributional structure with regard to resources and steppening of economic maladjustment by heavy distortion of prices. In fact, the pricing system of our country came to be entangled in the dynamics of an economic system which was constructed on the Voltaircan maxim: "we must continue to cultivate our garden with the tools we have today", irrespective of the grave damage that the adoption of such a policy might impose on the long-range stability of economic evolution. A major economic crisis was brewed out of "diversion of the productive resources.....to purposes bearing no

* Vide the Author's Post-War Economic Coordination for India.

† American Economic Review, March, 1948, p. 42.

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fruit"*, and was further complicated by the enormous resistances that developed in the pricing mechanism which had lost its fundamental capacity for equilibrium by being distorted to stimulate production of goods and services to the imperious needs of heavily distorted demand schedules created by the abnormal economic conjuncture of total war. We learn; "India's exports to British Empire countries rose during the war, while its imports from those countries declined noticeably in response to increased home production. This tendency has been strengthened since the war".† Similarly the same source informs us: "In India, the initial rise in demand during the war was largely owing to budget deficits and to Allied military expenditure"‡.

These observations need careful considera tion. We have seen how the absence of a powerful economic incentive was responsible for encasing the major part of the economic system of our country within the steel-frame of subsistence economy where price-elasticities were mainly absent. When the war started, the heavy distortion in the preference ratios of the population particularly in the first phase of the war, when Britain's chances of success hung in the balance, was more in favour of commodities and precious metals than of currency whose value was fluctuating enormously by the additional consideration of the inflationary pressures that were manifesting in price-formations. When the eastern front flared up in Burma, the benefits of regional balance in economic administration appeared overwhelmingly advantageous to exchange of goods in a wider market through a medium of exchange which had suffered in value by the grave uncertainties of war. The swing was, therefore, towards a return back into the framework of subsistence economy which intensified the flight from currency into goods, heavily distorting price formations and createcd all the major difficulties by developing sectional bottlenecks and complicated the mechanism of equilibrium in the markets by further aggravating inflationary pressures on the pricing mechanism of the country. The economic system of the country began to develop all the symptoms of high degree inflation like, rising prices, steepening of wage-formations, abnormal demand curves, deficit budgeting both at the Centre and in the Provinces, fall in the rates and volumes of free investments and the interminable play of economic shadows and lights of uncertainty on the economic horizon, which could not be explained by any cogent apparatus of analytical processes in forecasting of economic trends. As the war progressed, and rigidities

* R. G. Hawtrey, American Economic Review, March, 1948, p. 42.
† Economic Report 1945-47, January, 1947, U.N.O. p. 85.
‡ Op. Cit. pp. 26-27.

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in the marketing mechanism developed with the introduction of controls and rationing, there was an intensification of the penumbra of black-market operations which imbibed all the morbid features of subsistence markets and blurred the margin of demarcation between subsistence economy and exchange economy.*

Thus as the pricing mechanism of the country began to lose its equilibrating forces, and began developing sectional rigidities within its orbit of adjustment, subsistence economy increased its sinister hold on the rural areas choking up even the normal channels of price-elasticity of supplies and steepening the forces of scarcity and driving equilibrium forces into the penumbra of blackmarketing zones. Thus forces of equilibrium receded into the orbit of unlicensed exchange of commodities surrounding the focal area of controlled prices. In this sense, the economic problem of India can be said to have been caught in the processes of a violent transition in which the contours of subsistence economy merged into the frontiers of exchange economy and created a wide margin of economic administration of the slender resources of the country in blackmarkets. It is thus that the illusion of an 'economic potential for war', raised on the frozen production schedules of a subsistence economy generated the dangerous illusions of a "price incentive" for increase of production and ended by muddling up the mechanism of economic adjustment and intensifying the rigours of scarcity of all goods and services, which created the morbid mirage of inflation! Thus the mechanism of primary as well as secondary production broke down in attempting to accelerate its production processes in response to price-formation where divers forces were freezing the equilibrating trends and intensified the economic muddle in the country by generorating sinister bottlenecks, whose impact was disastrous for economic equilibrium in view of the special economic conjuncture which the War created in all departments of the economic life of the subcontinent. A clear analysis of this complex would be most instructive as well as interesting.

The bewildering crisis that enveloped the economic situation of our country can thus be diagnosed as the result of two factors: (*a*) "the rigidities", as Prof. Robbins would call it, "of the allocation machinery" of subsistence economy, "which was palpably insufficient for the tasks which was being thrust on it", and by the equally rigid "apparatus of control and incentive" of price-formations in the market which was already "in a state of visible disintegration";† (*b*) the forces of economic disequilibrium

* The reader can get a clear idea of the ideological twilight that had caught this country by a perusal of the Report on Rising Prices issued in September, 1948.

† Prof. Robbins The Economic Problem in Peace and War p. 57

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released by a series of sectional controls of price-formations and the normal resistances inherent in the mechanism of adjustment between subsistence economy reacting to competitive pricing-mechanism which had lost its fundamental elasticity.

If it is true that "the making of war is essentially a matter of command over resources"* the mechanism of price-control becomes defective in mobilising the economic war-potential of the country, unless this control gives the administering authority the requisite degree of 'command over resources' to enforce its decisions in economic affairs to reach its objective. Otherwise the control system will lead either to a drastic reduction of war potential by creating enormous rigidities in the mechanism of adjustment between prices and production or to serious dislocation in economic administration which will permanently hamper the economic system from returning to peace-time readjustments by freezing parts of the economic system and creating enormous friction in economic administration. In India during the recent war, neither was the administration's command over resources adequate for an efficient economic mobilisation for total war nor could the task of mobilisation of any portion of the normal command over material and manpower resources to war exigencies be performed without creating serious dislocations in the existing economic system of the country. Naturally as the war intensified, the entire mechanism of economic administration in the country—both the allocation-machinery and the controlling and regulating machinery—was caught in the process of disintegration, creating unpredictable movements of men and materials, abnormal changes in crop and industrial production schedules, erratic price and wage formations, fitful movements of rates and volumes of interest and investments and precipitating a general collapse of economic administration with a series of bottlenecks; production bottlenecks, labour bottlenecks, transport bottlenecks and investment bottlenecks. All this only intensified inflationary pressures on the mechanism of economic adjustments and the system of control and regulation of market forces adopted to force the economic system to release its war-potential only succeeded in deepening the shadows of economic distress over the lives of the four hundred million people who were entangled in tentacles of this economic transition.

The stagnation that overtook production schedules in the country creating a frozen standard of living in the last decade and half becomes clear to us when we project the data pertaining to the rise of prices during the war-period over the indices of production.

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Price Indices

Base 1939--100

	1939-40	1945-46	1947-48
All primary Articles	111.9	281.4	359.9
Manufactures	116.5	242.8	312.7
General Index	112.9	254.2	349.2

Source: Eastern Economist and Reserve Bank Report on currency and Finance, 1947-48, p. 53.

It is clear from a study of the table projected above that the rise of prices in India did not prove to be an adequate inducement to increase of production and that, on the other hand, the progressive scarcity of commodities created by the rigidity of response from agricultural and industrial production led to further steepening of prices and expansion of the aggregate volume of purchasing power—these inflationery pressures on the price-formations reducing the rate of profit and sterilising the price-elasticity of production—which was one of the major factors in generating production bottlenecks in addition to the usual dislocations that set in during a period of war.

The accompanying data would show the movement of profit during the period under survey:

Index of Industrial Profits All Industries

Base 1928—100

1939	1940	1941	1942	1943	1944	1945	1946
72.4	99.9	135.4	169.1	170.9	162.8	163.2	159.4

Source Eastern Economist, December, 1948, p. 1127.

A few words of explanation are needed in interpreting the above table which gives us the general trend of profits during the war years. The general index for all industries *would have been lower* but for the heavy rise of profits in the cotton, paper, coal and steel group of industries, for instance, profits in the cotton group which stood at 154.5 in 1939 shot up to 988.6 in 1943 and declined to 680.5 by 1946. Similarly the paper industry which had its index of profits at 151.8 in 1939, found it inflated to 535.8 by 1943 though it sagged down to 341.7 by 1946. In the steel group, the peak was reached in 1942 when the index stood at 402.2, which dropped to

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324.7 by 1946. In the coal section the highest level was touched in 1945 when the index stood at 360.6 which dropped in 1946 to 278.8 by 1946. During the same period, the index of real profit was on the down gradient as the table below proves:

Index of Real Profits

Base 1939—100

1940	1941	1942	1943	1944	1945	1946
132.1	163.4	160.6	96.2	90.6	89.7	82.3

Source Eastern Economist, op. cit. p. 1127.

These data clearly demonstrate the phenomenal collapse of price-incentives to production and the impact of abnormal demand curves on price-formations which went on contracting the price-cost margin and, where pressures were heavy on demand curves, prices were carried higher which had their repurcussion in freezing supply curves and this process of lack of response was more keenly felt in all sectors of the ecnomomic system, as price-controls were introduced making prices *sticky* in the mid-period of the war, specially in those essential groups of commodities which were needed both for defence purposes as well as for purposes of civilian consumption. Two basic trends can be noted from a keen study of the above data: (*a*) the sluggishness of the mechanism of adjustment in rpoduction shedules which sharpened with the rise of prices and steepening of inflationary pressures on the pricing mechanism both in the rural as well as in the urban centres (*b*) the collapse of price-adjustment as an incentive to increase of production, demonstrating the existence of frozen structure of preference ratios which sterilised the processes of price-allocation of productive resources operating in the vast areas of the country.

Was the lack of response from the national structure of agricultural and industrial production to price-dynamics due to inherent rigidities in the mechanism of production and the result of the technical difficulties which had frozen the rural and urban production schedules? Or was it the consequency of the existence of distorted scales of economic preference which were shaped by the presence of grave uncertainty with regard to the trend of price-formations and the general loss of confidence in the relative permanence of the economic trends which had created price-distortions? Or was the lack of resilience in the productive system due to the play of mere psychological factors which heavily dislocated the stimulus of the economic incentive to expansion of production and created scarcity scales

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of valuation? What was wrong and where? These are the fundamental questions which demand an answer before we can appraise correctly the shape and intensity of the economic problem of our country caught in the tentacles of a period of readjustment and transition and it is only a clear appreciation of the contours of the transition which has dominated the economic system today that will help us to understand the magnitude of the task of economic rehabilitation in the momentous years ahead.

"So far as agriculture is concerned," we learn of the situation between 1939 and 1948, "the bread conclusion remains that *the stagnation which has been a marked feature of the land in this country, continues even more obstinately than before*".* The following table presents a morbid picture with ragard to food production during war-years.

Food Production

	1939-40	1942-43	1947-48
Production of foodgrains in thousands tons	46,083	48,063	45,643
Area under foodgrains in '000 acres	166,994	175,948	185,794
Population adult Units in millions	251.0	258.5	271.0

The foregoing table goes to prove the existence of stagnation in the production-scheme for goodgrains. Except in the year 1942-43, when there was an increase of 2 million tons of foodgrains for an additional area of about 9 million acres giving an average yield of less than a quarter ton per acre, in 1945-46 as well as in 1947-48 though more than 20 million acres had been allocated to foodgrains, the aggregate yield of foodgrains was much less than for the year 1939-40! Even allowing for regional failures of farming seasons, it would be difficult indeed to imagine that an additional area of 20 million acres did not add a single grain to the total food production of the country. The decade under study further saw an increase of adult units by 20 millions, while the food supply from our land resources showed a definite decline both in the average yield per acre as well as in the aggregate volume of production.†

This situation needs careful analysis.

As the mobilisation of the country for total war gathered momentum, there was an intensification of the drive for procurement of foodstuffs accom-

*The Eastern Economist, op. cit. p. 1121.

†Eastern Economist Annual 1948, p. 1114. †ibid. Italics mine.

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panied by enormous fan-fare and propaganda predicting grave shortage of foodgrains. This created a scare among the larger sections of the population and the enormous difficulties in the interregional movements of foodgrains due to the stiffening bottlenecks in the transport system of the country coupled with the strategic reverses suffered by the United Nations in 1942 had a sinister influence on the psychological background of the rural markets for primary commodities and drove a good portion of the available quantity of foodgrains underground. The extent to which the statistical return for the period beginning with 1942 was vitiated by wrong presentation and deliberate manipulation of village records can only be appreciated by the vast area of blackmarketing which exited in the country in foodgrains and the general failure of the procurement and *Grow More Food* drives. This only precipitated the tendency to higher prices and greater scarcity of commodities, which went on widening the area of blackmarketing in the rural as well as in the regulated areas of the country bringing about the ultimate collapse of the pricing mechanism of the country in the task of adjusting the movement of commodities to the intensities of demand schedules operating in the national markets.

The sharp rise in the general trend of prices on and from 1943 cannot adequately be explained either by the decline in the aggregate volume of production of food grains as the index of production for rice stood in 1943-44 at 109 with 1938—39 as the base and the index for millets and grain stood at 111 and 121 respectively, while that for wheat alone showed a fall of 10 points and even by 1947-48, the general index for the foodgrains group stood at 98, while the consuming adult units showed an increase by 20 millions. The price-index of food articles rose to 292.2 in 1947 and to 394.1 by the end of 1948. We are told that "these figures have been used to prove inflation as well as to deny it".*

The data furnished above proves that the phenomenal rise of prices in the foodgrains group did not act as an incentive to any increase in the volume of foodgrains but the trends in food prices were the result of scarcity in foodstuffs created by the presence of rigidities in the adjustment of foodsupply to the contours of demand schedules that were set up in the urban areas for foodgrains and the enormous pressures that were imposed on the normal margin of surplus over local consumption of foodgrains in the rural areas, to which must be added the abnormal population movements which occured among the 40 million landless labouters in the rural areas who were subjected to enormous economic distress with the

*Eastern Economist, December, 1948, p. 1139.

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intensification of subsistence forces as economic scares deepened in the rural areas.

It was unfortunate that the fact that in subsistence economy the supply curves lack price-elasticity was not recognised by those who were in charge of food administration in our country. Consequently there was terrific friction in the mechanism of adjustment between prices and production and this friction was attempted to be solved by resort to forceful procurment of foodgrains, specially as the area of rationing was enlarged after 1943. This maladministration resulted in setting up vast areas of blackmarketing which went on widening its activity as controls began to spread. In fact, the deepening of the food problem in our country can easily be ascribed to the clash between subsistence forces of economic adjustment and the equilibrium forces of the marketing mechanism. This conjuncture generated heavy distortion of rural scales of preference by multiplying psychological and economic inhibitions which drove people to hoard foodgrains, pushed prices further up, intensified inflationary pressures and ended by sterilising the machinery of food administration which could not function without generating corruption of the worst type within the ranks and files of those who were called upon to serve the department. Thus the economic conjuncture which the war imposed on the country in a mad stampede for harnessing an illusory war potential in economic resources was responsible for the sinister flight from currency into goods which brought into existence the high spiral of prices and volume of currency which have been chasing each other to this day!

It must be recognised that when the war brkoe out very visiblly on India's economic horizon, the economic potential of the country for war was negligible. There was little surplus of food production over local requirements in the vast rural areas, and the increasing rate of urbanisation had to be maintained by import of foodgrains as we have seen earlier in the course of the book, specially from Burma while those parts of the country which have gone over today to the Dominion of Pakistan were considered to be surplus zones in matters of food production. In fact, the growing pressure of population on land resources had created a deadly tendency for rice and wheat to become commercial crops and conversion of foodgrains like jowar, bajra, maize and ragi into the staple foodgrains of the rural population. The result, was the price of these inferior foodgrains which were the subsistence of the rural populations was raised to a level comparable with the price of better quality of grains and the problem of foodsupply

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of the primary strata of the urban population assumed a menacing size with serious impact on the formation of urban wage-standards and the composition of industrial costs and urban standards of living. This again resulted in contaminating production schedules for the inferior grains which have been more satfactory than those for higher quality grains. Thus, while the indix of production of rice wavered between 92 and 104 in the period under survey, the range of oscillation in the millets and grain group was between 99 and 114 for millets and 86 and 137 for foodgrains!

Further several other forces peculiar to mobilisation for war were released on the subsistence framework in the rural areas which served to dislocate the scale of economic preferences in the villages which was impervious to the antics of the pricing mechanism in urban areas, and widened the gap between the supply schedules and demand schedules for foodgrains: (*a*) mobilisation of control with forceful procurement of foodstuffs which deepened the scare in rural areas and intensified the trends towards subsistence farming; (*b*) the methods of propaganda regarding *Grow More Food* adopted by the Government which intensified the psychological gloom that existed in the rural areas and generated a general tendency to withold stock as well as information regarding the production of foodcrops over vast areas; (*c*) heavy wage-movements in the urban areas and war zones which created abnormal movements of population created labour scarcity and intensified the trends towards subsistence framing; (*d*) the general psychological framework which created a scare in the minds of the rural population which steepened the flight from currency into goods, distorted the scale of economic preferences and precipitated scarcity conditions in the grain markets, carrying prices higher and higher; (*e*) the inadequacy of controls which rendered the markets for foodgrains highly shifting and nebulous and the general uncertainty with regard to the time-structure of price-formations combined to freeze the mechanism of adjustments between prices and production and drained available supplies into the blackmarkets where prices were synchronised with the economic preferences of the rural populations or into local hoards, as the uncertainties of war further complicated the working of the price-mechanism. All this tended to steepen the contours of subsistence economy, and as the production schedules got involved in the economic meshes of farming for living, scarcity of foodgrains became sharply pronounced.

Further to prove that mere pressures on the demand curves in the urban areas did not increase the price-spiral with regard to foodgrains,

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we must remember that the aggregate increase of 20 million adult units did not take place in the urban areas alone, as the volume of urban population is only 13 per cent of the total population according to the Census of 1941, and even if the rate of formation of urban groups under the abnormal stresses of war-time demographic redistribution had risen to 20 per cent which is a very generous estimate, we would get an additional urban population of 4 million adult units, the rest of the population being spread over the rural areas, where the market for foodgrains is severely restricted. Even allowing 400 lbs. per adult unit per annum of foodgrains, the normal market for foodgrains in the urban areas did not increase by more than .8 million ton.* Even if we take the entire volume of increase of population of 20 million additional adult units for the whole country, an additional 4 million tons would have balanced the cereal requirements of the entire population and the production of 4 million tons of additional foodgrains was not beyond the capacity of the additional 20 million acres of land resources that were allocated to foodgrains in the period under survey.

These data lend colour to the view that the bogey of food scarcity raised during the war was only an economic strategy to secure a growing margin of food production, which had remained stagnant under the impact of production for subsistence, and it has been estimated that the country requires *4 million tons of foodgrains today* to make it selfsufficient in matters of foodstuffs, and specially the food deficiency at present is noticeable in regard to wheat whose production in 1947-48 was only 76 per cent of the production in 1938-39. Against this background, it would be very difficult indeed to project the disparity in the rate of production of foodgrains and the dynamics of population as the cause of the steep spiral of prices which advanced in this group from 292.2 in 1947 to 394.1 by November, 1948, while there was no fall in the aggregate volume of production of foodgrains in this period, but actually there was an increase from 97 in 1946-47 (index number) to 98 in 1947-48, and even the argument that in the year under study there was an increase of 2.5 millions adult units (i.e. from 268.5 millions in 1946-47 to 271 millions in 1947-48) will not adequately explain the sharp rise in prices, which can only be explained by the enormous expansion of the area of blackmarketing in the country, which heavily distorted the operation of the equilibrating forces of the controlled markets in foodgrains. Expansion of the area of blackmarketing resulted in corruption of the controlled markets, defeated the procurement drives of the Government, falsified the statistical returns regarding food production

* Cf. Eastern Economist, op. cit. p. 1121.

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and intensified inflationary pressures on price-formations, by paralysing the control and rationing systems.

"It is clear then", we are told, "That the stagnation in agricultural production is primarily responsible for the fall in India's real income per capita, as the population continues to increase with production unaffected".* We have seen earlier how lack of adequate economic incentive which could have transformed the economic set up of the country was responsible for creating vast areas where the pricing mechanism was effectively sterilised and the production-schedules of subsistence economy in the greater rural areas could not find their balance with competitive price adjustments. This peculiar economic conjuncture was responsible for creating wide areas of economic stagnation in the country and preventing forces of economic advance from galvanising the economic civilisation of the subcontinent.†

It is needless to urge afresh that during the recent war, nothing happened in the stagnant parts of the economic system of the country to release these forces of economic advance on the apparatus of agricultural production over the 500,000 rural zones. The process of readjustment which was invoked to mobilise the economic potential of India for total war was made to function through the manipulation of the traditional pricing mechanism which lacked the energy to provide an adequate spiral of economic incentives which could have transformed the productive system of the subsistence type which had caught the rural areas in its sinister grip. Instead, mobilisation of the economic potential for war in our country only intensified sectional bottlenecks which are inevitable when a subsistence economy with little economic potential of war is geared up by heavy distortion of price-formations, on which inflationary pressures are clearly manifest. This peculiar economic set up only magnified the forces of friction that normally function in dual economy. This has naturally complicated the problem of balance between subsistence economy operating in the vast rural areas of our country and the competitive forces at work in the urban areas. "Such dual economies constitute", Prof. Fisher tells us, "a new type of economic system created in the twentieth century..... The most characteristic feature of that system is the fantastic diversity of income levels methods or production and forms of economic organisation contained within it".‡ The recent war only steepened the divergences

*Eastern Economist, Ibid.

†Prof Fisher: Economic System, Past and Present in ECONOMICS Odhams Press, 1949. Vide p. 142. Specially *Dual Economy.*

‡Fisher in op. cit. p. 142.

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between the two processes of evolution precipitating an economic crisis born of a further prologation of the economic transition in which this country has been caught for the past century and half.

While the war of 1939-45 did nothing to smoothen out the process of transformation from the subsistence economy to competitive type of economic administration of our material and manpower resources, it demolished the delicate working of the primary pricing mechanism which dribblets of agricultural goods released by subsistence farming had built up in the rural zones.

It is plain from a study of the trends in agricultural production in recent years in our country, that the pricing mechanism in our country has failed to bring about any kind of transformation either in agricultural production or in the flow of agricultural commodities into the primary markets of the subcontinent. Abnormal price-trends set up during the war and perpetuated during the post-war years so far, have only succeeded in widening the area of blackmarket operations in view of the basic deficiencies of a control and rationing system not comprehensive enough to cover any appreciable portion of the aggregate volume of transactions in matter of the essential consumption needs in foodstuffs and industrial goods of the majority of the population of our country. The magnitude of blackmarketing operations has been such as to defeat the procurement drives of the Government as well as to render the rationing system operative over wide areas, by corroding the morale of the administrative machinery set up to work the system. This has destroyed the outlook of the people with regard to the administration of their individual resources and set up a morbid structure of liquidity preference ratios which possess all the vicious symptoms of perpetuating the spiral of prices and precipitating in the final phases of its evolution an economic depression of the utmost intensity born of complete exhaustion of the money and commodities markets of the country. The symptoms of such an economic collapse are already visible on the horizon.*

It remains now to see what transition the recent war wrought in the industrial system of the country. The biggest sector of the industrial structure is the textile industry and its growth can be tabled as follows during the period under survey.

*The crisis towards depression has begun in the cotton industry.

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The Growth of the Textile Industry from 1935 to 1948

Year	No. of Mills	Number of spindles	Number of looms
1935	365	9,685,175	198,867
1940	388	10,005,785	200,076
1943	401	10,130,568	200,890
1944	407	10,222,107	201,761
1945	417	10,238,131	202,388
1946	421	10,305,169	202,814
1947	423	10,353,974	202,662
1948	422	10,433,065	202,072

Source—Indian and Pakistan Year Book 1949.

In the thirteen years under survey, about sixty new mills were added with less than four thousand looms, and in spite of the impetus afforded by war conditions and the gap that as created by the sterilisation of foreign competition and also by the accelerated demand for indigenous goods in the textile groups, there was no substantial change in the general structure of the industry. Though we are told: "The war in Europe which commenced in 1939, opened the prospects of a spell of prosperity for the industry",* the same source tells us again that "the industry was unable to meet the growing demand and the prices were pushed up to four times the pre-war levels".†

In the cotton industry two distinct trends are noticeable during the war-years (*a*) fall in the aggregate volume of production of cloth and (*b*) contraction in the volume of exports, without any substantial rise in the tempo of domestic consumption to balance the industry. Thus in woven goods, production fell from 4,726 million yards in 1944-45 to 3,770 million yards in 1947-48; while in yarn production fell from 1,533 million lbs. in 1942-43 to 1,338 million lbs. in 1946-47. During the same period, our exports of cotton piece goods had dropped to unprecedented levels: from 688 million yards in 1942-43 to 192.4 million yards, the heaviest loss in our export markets being felt in Iraq, Iran, Straits Settlements, Aden and Kenya.

These trends prove certain special features of the textile industry: (*a*) that a good portion of the technical equipment needs drastic overhaul in view of the fact that over seventy per cent of the industrial units have

* India and Pakistan Year Book, 1949, p. 422.
† Ibid. Op. cit. p. 421. Op. Cit. p 422.

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technical equipment which is at least a half century old; (*b*) that there should be a concerted attempt to balance the structure of the industry on domestic markets in the years to come in view of the uncertainty regarding the maintenance of foreign markets for textile goods in the new economic set up in which considerations of the eventual spread of technical equipment in the backward areas of the world would drastically reduce the area of foreign markets for the industrial goods of any country in the essential groups; (*c*) that the prices for textile products must be reconstructed with a view to widen the area of domestic markets for textile goods, which would mean the installation of uptodate technical equimpent for the industrial units to reduce production costs; (*d*) that the main rigidities of the present location of some of the industrial units must be dissolved through greater degree of capitalisation and automatisation of the processes of production, in view of the basic rigidities which prevent any drastic reconstruction of the wage-formations to keep down production costs which are frozen by the additional factor of uneconomic location.

"After about six years of total war", writes the author of the Indian and Pakistan Year Book, "India's industrial equipment was overworked to almost breaking point".* Our study of the data with regard to agricultural as well as industrial progress of the country during the war years has demonostrated that this statement has to be taken with a great deal of caution. During the war years, there was no epoch-making transition either in agriculture or in industry. India's economic system had very little of war potential which could be mobilised. We have seen how attempts to mobilise the war potential of subsistence economy had to be attempted by normal distrotion of primary prices and how management of price-formations did not create any response from primary production and resulted in intensification of inflationary pressures on the pricing mechanism which affected economic and liquidity preference ratios of the population and steepened the contours of scarcity economy. The factor of uncertainty with regard to the time structure of price-formations which depended on the uncertainty of the duration of war effectively sterilised any incentive which price-oscillations might have possessed during normal economic conjuncture. In the industrial system of the country also, price and wage-changes failed to bring about any appreciable degree of response either from labout markets or from the industrial system by way of increase in the volume of production of industrial commodities or even in raising

*Op. Cit. p. 331.

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the volume of raw materials for several industries like the cotton and sugar industries. Lack of technical equipment in adequate measure to step up production was not the only casue for the enormous bottlenecks that developed in the industrial system of our country, since the labout markets was in a state of eternal combustion during the war-years as the adjustment between wage-rates and costs of living in the urban areas could not be sufficiently bridged by the payment of dearness allowance. Throughout the period of war severe controls were imposed both on production as well as on movement of goods and serviccs and the pricing mechanism was forged to mobilise the evasive war-potential of the country with the least expenditure to the Government. Hedged in by the rigidities of the wage-structure on the one hand and by the spiral of rising costs of living and of the raw materials together with controls of production and of investment on the other, the industrial system of the country was unable to respond to the abnormal conditions which were manifesting themselves in the industrial markets of the country. As demand curves were subjected to enormous pressures in the markets, a situation developed in which a vicious spiral of prices and inflation became inevitable and had the war continued for a couple of years more, there would have been a dramatic collapse of the economic system by sheer internal exhaustion and we would have been victims of the deadliest runaway inflation the like of whichthis country had not seen in the entire course of her evolution through the centuries What was shwoing sinister trends of collapse was not the agricultural or industrial structure but the pricing mechanism which was unable to bear the heavy pressures that were being impose on its working. The velocity of circulation of goods had so far been accelerated that the marketing mechanism was unable to stand the impact of the forces of regulation of the volume of supply to the intensities of demand through price-readjustments and had intensified the momentum of circulation of the medium of exchange which brought into existence a huge volume of redundant money on the markets of the country pushing prices up further. It is thus the money market was subjected to heavy pressures while the obnoxious controls invoked by Government to regulate investment in the one hand and steepening of tax pressures on the other developed rigidities in the proper administration of our industrial resources even during the war-years.

"Steps have been taken or are actively planned", writes the Economic Report of the U.N.O., "by the governments in various countries (*of Asia*) to increase production, improve transport and otherwise to promote recovery.

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Most of the needed reconstruction still remains to be done".* The war of 1939-45 helped to focus the attention of the authorities on the lack of co-ordination in the different processes of economic evolution in the country and the main effects of war were felt very keenly on two major departments of economic advance: the money-market and the transport system, which developed grave symptoms of dislocation. The transport system betrayed sinister symptoms of strain imposed by war-time acceleration of the movements of goods and services and the money-market was reacting to the enormous velocity of monetary transactions which the war created by heavy distortion of price-formations.

The main trends that we have attempted to study and analyse in the foregoing pages in the economic life of the country during the period of mobilisation of the war-potential have testified that there was little fundamental transition in the general economic landscape of the country and that the economic incentive provided by mobilisation processes and readjustments during the war period was instrumental in steepening the basic resistences that normally operate in subsistence economy in its mechanism of response to price-dynamics, and the consequent functional shortcomings of the pricing mechanism to generate any forces of economic advance in the peculiar economic conjuncture prevailing in our country today. Any attempt to adjust the economic data of the country to the basic forces of economic advance through the pricing mechanism would only steepen the contours of scarcity economy and sterilise the forces of economic progress, by blurring the frontiers between subsistence zones and areas of competitive administration of the material and manpower resources of the country. This would only prolong the processes of economic transition and deepen the agony of economic reconstruction for higher living standards.

The forces of adjustment operating throughout the war period can be said, therefore, to have achieved not only a partial paralysation of, what Professor Robbins calls, "the full automatism of the price-system"† but also brought about, through distortion of the functioning of the money-of market and of the trading systems, a difinite dislocation of the pre-war pattern of "distribution of income and capital".‡ This had resulted in a fundamental transformation of the lay out of the economic forces which have to be adjusted to a peace-time pattern of economic advance. This transformation in the general economic perspective has created vast problems

*Economic Report 1945-47, U.N.O. 1948, p. 69.
†The Economic Problem in Peace and War, p. 7. ‡Ibid, p. 5.

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of economic administration in view of the fact that our country had been, throughout the processes of economic change from the nineteenth century to the outbreak of the war, caught in the clash of the economic dynamics of subsistence economy with the processes of adjustment functioning within the mechanism of the market and developed certain morbid rigidities in the course of this clash which had to be resolved in order to prepare the country for an epoch of economic advance.

Any transformation in the economic system of our country to prepare it for a process of economic advance along twentieth century patterns of economic change would have to provide for the widening of the area of operation of the pricing system and for the dissolution of the basic rigidities of subsistence economy functioning in the vast rural areas of our subcontinent; or of replacing the price incentive by drastic institutional changes necessary to effect economic transition through comprehensive control of economic evolution in the years ahead of us. The recent war failed to effect any such fundamental change in the economic incentive by generating an economic conjuncture which could set up a framework of economic adjustment to prepare the country for an arduous process of economic progress. It only ended by destabilising the pattefn of distribution of resources and sharpened the economy of scarcity which exerted a terrific pull on the general outlook of the people on the future of business and investment in the country.

There is nothing strange if the war period and the phenomenal transformation in the pattern of prices which it created, failed to create any fundamental change in the tempo of business activity.

It should serve to dispel the illusion that is held in some quarters that economic mobilisation for war created a definite economic transition in the country by stimulating agriculture and industry, transforming the occupational system and unleashing new forces of economic advance which should carry the country to an epoch of glorious reconstruction of the economic life of the four hundred million people of this country in their crusade for better patterns of living in the post-war world. It is true that the war-period readjustment served to bring to the forefront some of the basic problems of economic maladjustment which had remained dormant during the hundred years of the country's economic evolution and focused the attention of the public on certain aspects of economic life like the food problem, the problem of the money-market and the general

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problem of control of economic evolution if we are to aviod the crisis of an economic collapse and the difficulty of attempting any lasting reconstruction within the freamwork of an unplanned economic system and an automatic marketing mechanism and emphasised the need for comprehensive planning of future economic evolution.

This analysis inevitably takes us to the conclusion that economic rehabilitation for our country "is essentially a matter of expansion as well a thorough reorganisation of the working of the whole stsyem". It is plain that any fundamental change in the existing pattern of distribution of resources cannot be attempted through the readjustment of the machinery of the market without enormously multiplying the sources of social, economic and psychological friction. We must realise that the task of economic reconstruction in India in the years ahead will be "essentially a matter of command over resources"* and when we understand that the existing pattern of 'command over resources is hardly capable of unlocking the potent forces of economic advance in the country, the argument for a complete change in the existing pattern of command over resources will become irresistible.

This change in the pattern of command over resources will not come without reconstruction of the entire structure of production in the rural as well as in the urban areas of the country and a fundamental change in the allocation machinery so as to mobilise the full economic potential of the economic system to sustain higher living standards for the population of the subcontinent. Such a gigantic task is beyond the reach of the market mechanism as well as the capacity of the tax structure of the country, which would be thoroughly incompetent to bring the required change through the functioning of the tax-structure, and the methods of public borrowing. We must realise the magnitude of the task of reconstruction of the economic system which includes not only change in the existing patterns of distribution of *existing* resources but increase in the *aggregare volume of the resources themselves*. This necessarily involves not only reconstruction of the different sectors of the economic system but its balance with the economic dynamics of the world in the days to come.

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* The Econmic Problem p. 31

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WHERE NEW METHODS ARE OLD

Prof. U. A. Asrani.

With entrance examinations on the decline, the interview and the school ratings of personality assume a decisive importance. In the context of conditions in our own Uttar Pradesh, this quotation from 'We who teach' of Jacques Barzun of the Columbia College (U.S.A.) excites curiosity. We here, are also being forced by the sheer weight of the number of candidates appearing at our High School Examination to think of some alternative to the hackneyed, very much cursed, and the often frustrated test of examinations. The Radhakrishnan University Commission Report has thrown much light on this subject and our education minister, Hon. Shri Sampurnanand, has been perhaps the first out of all education ministers of India to venture seriously into the fields of psychological testing and pedagogical research.

So let us see, what this American Professor of a well known institution has to say on this subject. 'Naturally no system worked by human hands', he says, 'will insure justice and the examination in subjects was hardship for many; but there is a special kind of cant produced by the newer way, which I confess, I particularly dislike'. This is discouraging enough for those who have been anticipating entry into a heaven by discarding examinations and replacing them by interview and psychological tests. But let us hear what this new cant is, which Barzun so particularly dislikes. 'It (the interview) amounts to a sort of a demand for subtle flattery of the questioner or the institution on the part of the candidate.....The upshot is that in many serious matters of admissions, of scholarship grants, of grades and honours—the advantage goes to the precocious worldling who has found out the "ropes" or to the instinctive hypocrite'.

It appears almost as if Barzun were writing a criticism on some of the public service interviews here in India. Human nature appears to be the same everywhere. Candidates for these interviews are tutored before hand by clevérer or more experienced persons to say things flattering to the interviewing committee; or they are informed as to what exactly would tickle the fancy of a particular member or chairman.

I went to Sevagram in 1941 to meet Bapu and I was surprised to learn, that people round about him had discovered the keys to his heart too.

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'You have only to fall ill in Sevagram', they said, 'and you are sure to get personal attention from Mahatmaji'. Another 'catch' to tickle his imagination was to talk on moral or dietetic problems with him. Politics was so usual with him; these topics tickled him more, I learnt. Bapu was not at all a 'clever' politician in the sense of keeping secrets; but even the very cleverest of politicians are successfully uncovered by people around them. How can we academic people expect to escape this psychological dissection? Our students here trace out our tastes some how and predict the questions we will impose on them in our question papers; the American student searches out the 'ropes' that will pull the depths of the heart of the Chairman of the Interviewing Committee. Have the new methods helped them, over there, to evolve a surer test?

Now to the psychological methods. This is what Barzun has to say side by side with interview, the passion for fuzzy psychologising has led to the use of tests and questionnaire for choosing and "guiding" students into and through College. The child hoping to enter College writes for a week—her autobiography, her hopes, her fears; she is asked about her parents, her friends, her brothers and sisters. Her mother must also write. The child is so completely turned inside out that it is a wonder how she can still look like a 'freshman' (That is how new entrants to College are called in U.S.A.). Indeed she is more like an escaped convict, because while she had been doing a Bashkirteseff on her soul, her boarding school has reported all her quirks, failings and misdemeanours. That vase she broke, pursues her to the grave and her tantrums reverberate down the corridors of time. It is very curious that in the very age when criminology has learned that a fresh start calls for a new envioronment, with people taking for granted the reformed pirates' honesty, "modern" education has turned the "freshman" into an old lag. "Have you read Form A and Form B on Sally?" asks the dean of studies of a new teacher. "No". "Well, I will get them for you; so you can size her up". Sally's only hope is that the new teacher will keep the file shut and his mind open.

The question really is whether a soul is like a lump of sodium, the properties of which once investigated hold true for all time. This does not of course mean that psychological testing is useless. Barzun himself explains in a footnote that he is not against these tests; nor would he advise parents to withhold information. All the same he would desire parents not to regard the results of these tests as sacred truth; they should exercise their own judgments in using that knowledge. Mr. Barzun also argues vehemently against the importance attached to aptitude tests. These,

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he says, neglect the centre of all aptitudes, general intelligence ; and adaptability is the very core of this general intelligence. To neglect the soul of man, his general personality, merely because you want particular aptitudes out of him for a particular profession or industry, is not a mistake which, according to Barzun, a teacher at any rate should fall in.

The great vogue of psychological tests in the U.S.A. has resulted in the growth of the number of administrators known as the Deans. They receive and file reports, know each freshly admitted student by name and remember the striking features of his history. With numbers rising to a few thousands in each university, this is by no means a joke ; it is a job by itself, quite apart from teaching or research. 'This means that there has necessarily grown up a class of professional administrators, not members of the faculty, who find university life congenial and students interesting, but who would just as readily manage a brewery or a bank for all the attachment that they feel towards learning. This only aggravates the personnel situation in all its branches. Like businessmen or mangers they rely more and more on paper work, filing devices and punched cards... With such Deans or Directors, the "good fellows" on the faculty are at a premium. There is unconscious encouragement of self-advertisers, who turn out more Progress Reports than actual work. The good teacher is one who constantly uses his students as guinea-pigs for some 'study' or other.....This is the logical outcome of the indirect measure of quality, when once the direct sense of it has been lost. Oddly enough the fittest symbol of this loss is the Ph.D.'

Barzun is not against the doctorate degrees as such—'the three-letter fetish' as he calls it—but against the importance given to them as a vital qualification for a college teacher. 'The doctorate of course shows nothing about teaching ability'. The qualities required for the two are different. Then again a fresh college teacher must, in the present academic atmosphere in the U.S.A., write some books, publish some articles and deliver some lectures in order to make his position in the university secure. All these 'and learning to teach are almost always incompatible occupations ; and attempting both, under a superior's eye adds to the strain'. 'More literally, the American university system is built on two false premises, that all teachers must add to the existing stock of knowledge by research and that all self respecting institutions fulfil their role only by employing productive scholars'. 'Of course the teacher must keep reading and thinking abreast of his time ; but this does not mean that he must write and publish'.

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This appears rather strange when even so recent a report of so learned a body as the University Education Commission insists on research as a qualification for all the members of the university staff; even a lecturer ought to have according to that report 'a genuine disposition for research'. Most educationists here, charmed by the glamour of the American system, may call Jacques Barzun as one of the surviving reactionaries. But a glance at his arguments will reveal, that there is a considerable weight in them; it is not mere prejudice or reaction. Interviews, psychological tests, records of conduct and work, and so also research are relatively new educational ideas in our country, and we have a tendency to absorb them from the west without much of critical thought. Now particularly when we are independent it is worth while thinking on them over again. Not only are the conditions of our country considerably different; not only are we too poor to carry through to satisfaction some of the American and British methods; but even there acute and impartial thinkers have started questioning the utility of these newer methods. What is yet new to us is already old to them and we must gain from their experience and not merely imitate while we are reconstructing our system.

Good American universities inspite of their much larger resources have, we learn from Barzun's book, the same problem as we have here, of not being able to admit the large number of students who knock at their portals. As education advances in our poor but densely populated land, the problem with us will become acuter. People fondly imagine that in the west every country pays lavishly for higher education; they will receive these news from Barzun with a shock. If American deans are reluctant to open their gates to every candidate lest their standard be lowered, how can our deans be more generous. As a matter of fact we are being compelled to lower our standards, to increase our numbers and yet to refuse admission to a good many. The disappointed third divisioner is very nearly as good as plucked; although it is a well known fact that some of these so called 'third rate' men sprout forth in later life as very successful captains of business or industry or as influential leaders of public opinion. Commissions on university or higher education have been appointed in several countries and they have submitted their reports. But I wonder whether anybody has statistically studied the correlation berween divisions secured in university examinations on the one hand and the success or efficiency in the professions or in the struggle for life on the other.

The topic of objective tests is a third topic, on which Barzun has an amazing but by no means an illogical reaction. Radhakrishnan Com-

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mittee report has brought this type of tests into limelight for the first time in our country. Of course the report does not want us to depend solely on these tests, but it presents them as a new venture for us worth trying. But let us see what Barzun, for whom it is already old, has to say on it. 'They are an insult to Intelligence', he says, 'except when played with as parlour games'. According to him these tests discourage intelilgence of the high class type and give precedence to second rate faculties. The first rate men, according to him, 'see into situations quickly, and with the fresh, clear eye of Intelligence and they must be encouraged to continue. To them a ready made question is an obstacle. It paralyses thought by cutting off all connections but one. Or else it sets them thinking and doubting whether *in that form* any of the possible answers really fits. Their minds have finer adjustments, more imagination, which the test deliberately penalizes as encumbrances'. 'This basic difficulty' he says 'occurs, no matter how carefully the questions are drafted and how extensive their coverage'. He cites his own experience on a committee that prepared objective questions in history for the 'Graduate Record Examination'. 'In committee, it was revealing to see, how a question that seemed 'fool proof' and 'obvious' to two or three men, thoroughly trained in their field, struck others of the same calibre as 'ambiguous' or 'misleading'. Add modifiers and you make the question so unwidely that it can hardly be grasped at one reading; simplify and you reduce it to a bare common fact'. Barzun recommends about four written tests a year supplemented with orals, every time some natural sequence of subjects is completed.

One more very interesting problem which Barzun raises is that of the content of College courses for women. 'The conditions of house work, which is the ultimate lot of most of the women graduates, are anti-intellectual; 'whereas the very essence of thought is continuity, the very essence of domestic life is interruption'. Unless a mother dares to disconnect the door bell, smash the phone and gag the baby, how can she be able to read a book or think a thought'. 'The majority have married and devote their entire time to the house-hold, that is the kitchen and the baby. Of these the most energetic may work for the League of Woman Voters or some such benevolent organization. But usually their College training never comes into play; indeed they are handicapped by four years of leisure and learning, for the battle of life over crib and stove. All this calls for sympathy rather than satire'. 'Any one therefore who thinks honestly about the matter must at least wonder whether the four years at Pomegranate College, and five thousand dollars and the conducted field trips to slum and factory were not time and money misspent. The query has

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nothing to do with feminism or antifeminism 'Barzun suggests that we must have some kind of differentiation between those like George Elliots and Madame Curies who would be specialists and the overwhelming majority who are going to be house wives'. Referring to the latter, he says 'the whole of the woman's curriculum, even in good places, with strict requirements, has no intelligent shape. It is in the transitional state'.

Barzun calls the American nation, a nation of highbrows. 'The highbrow or man of facts is a mere container. His mind is a sponge, which takes up so much and gives it out again on a little squeezing'. 'The evil arises from a radically false relation to knowledge, which is only a step away from a radically false relation to life. Undoubtedly no man can think without facts and that is why teaching is of facts and about them. But if they are stored up by thoughtless habit as a squirrel stores up nuts... their only use is the sterile one.....The men of fact, wait in grim silence, as Holmes said, to make a throw and claim a point' 'Now I contend' says Barzun 'that he and his kind (highbrows) are a drag on the nation's intelligence, that his view of things and men is part of a false ideal mistaken for practical wisdom'. Its corrupting influence vitiates according to him the whole scheme of instructions right from the primary grades to the highest reaches of scholarship. He believes that our educational institutions should on the other hand aim at turning out 'men of ideas' with minds accustomed not merely to holding facts in solution but to crystallizing them for use. We here, regard the American nation as a very practically minded nation. If an American himself dubbs his nation as one composed mainly of 'highbrows', where would he place our so-salled 'men of learning' in the scale of 'men of ideas'?

The most scathing criticism against the system of Education of the 'Richest Nation on Earth', that Barzun voices, is a hit at its volume of learning. It is volume without depth, it is extent without purpose. When we look at the huge libraries and laboratories over there, the immense amount of research work being turned out, day in and day out, the huge addition to literature of varied types being printed every year by millions of printing presses, we begin to feel like pigmies in their presence and exclaim 'Even the Gods may envy'. But Barzun has the audacity to ask 'To what purpose'? We might call him brazen faced if he were alone. Others have asked this very pertinent question. Mr. Arnold Nash thinks that even the Fascists and the Communists are ahead of us. The purpose of their education may be questionable, but it is definite. We on the other

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hand do not know whether our learning is for peace and good will among men or for power and for war, whether for march towards some definite ideal or a drift towards whatever may come.

The Radhakrishnan University Commission report voices the same feeling and holds that education should impart wisdom at the same time as knowledge; it must lead to an integrated way of life and yield a synoptic vision, a Samanvaya of the different items of knowledge. The report really reminds us that we have within our ancient culture those fundamentals of the real essence of education, which the west is yet unconsciously groping after. Dazed by the glamour of the western system of education, we are apt foolishly to imitate, forgetting that in the fundamental purpose of education the west is yet to learn from our ancient past and not we from them.

This article of mine may appear like a review of a book written by a scholar who has by no means a world wide reputation. I have of course quoted from him at length because I felt that he is a bold, frank and unorthodox writer on educational topics; but I have other American opinions also, opinions quite as unexpected and quite as revolutionary, if not more.

Mr. Morgan, the president of the Tennesee Valley Trust and a member of the University Commission of the Government of India (1949) presented a memorandum on higher education to the Unesco Seminar in Mysore (April 1949) from which I will now quote. The university commission's report, although unanimous, must have had the imprint, on its various parts, of the ideas of different individual members. The memorandum above referred to, leads one to suspect that the Chapter on 'Rural University' in the University Commission Report was perhaps a contribution mainly of this American educationist. Almost all of us in the universities here, teachers as well as students, have an urban outlook; we have a tendency to forget our obligations to the regeneration of the life and vitality of the rural areas which give us our food and give shelter to over 80% of our brother Indians. We here in India, have not scented yet the danger of increasing the concentration of population in our cities. Even the cry of Bapu against this urbanisation has been almost like a cry in the wilderness. Ever since the commencement of the war, the cities, both in India and Pakistan, have grown immensely and they are still growing.

Morgan, a citizen of the United States of America, the country with the largest number of huge cities of the world, regards this trend towards urbanisation as a danger signal, a sign not of progress but of the decline

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of civilisation. 'One of the causes, if not the chief cause, of such collapse of civilisations, is that cities draw the life from the villages, returning almost nothing, until the current village sources of culture and energy are largely exhausted; whereupon the whole civilisation declines, and the region is ripe for military conquest.....So far as we can learn, cities almost never maintain themselves by their own birth rates. Various studies in Europe indicate, that city families die out in four generations or less. American experience is somewhat similar. Ibn Khaldun writing in about 1400 A.D. indicated about the same for cities of great Arabian civilisation'. The worst feature of the migration from the villages to the cities is, that it is selective; 'Some people from every class migrate, but the movement is strongest among the more intelligent, the educated and the well-to-do; the village population tends to become more sodden, less virile, more inert'. It is worth while that with our emancipation from slavery, we set aside the coloured glasses of European civilisation and stop short in this mad race for urbanisation. Our own Bapu cried himself hoarse so recently, with his summons 'Back to the villages'; we did not heed him. Let us at least not be blind to the beacon lights of history held aloft by those farseeing thinkers of America itself, the land where what is yet new to us is already out worn.

But what has this urbanisation to do with education? Quite a lot. Thus thinks Baker Brownell, Professor of Philosophy at North Western University (U.S.A.). We here in India, have been so helplessly carried by the wave of urbanised civilisation from the west, that we tolerate its effects as if they were normal and healthy. School and College education which is a harbinger of that civilisation, has so much idolised the ideals of mechanical minds, individualised and self possessed hearts and urbanised outlooks that we have been watching before our very noses, the break up of family, community and village life, without even a qualm of conscience being aroused within us. Brownell hailing from a land where this process has proceeded much further says:—'The failures of higher education in America have become the concern of millions of people who a few decades ago would have been indifferent.....when the college becomes overwhelmingly an influence towards the aggrandisement of urban society, with the corresponding impoverishment of our small communities, it is no longer good. Instead of helping to enrich small communities and to stabilise them, the College in general serves as a channel whereby youth and wealth are drained away.....In this urban supremacy and its somewhat decadent predatory ideaology our higher educational system is involved. This

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probably is the greatest problem, educationally and socially, that Americans face today. But few are aware of it. Though much is heard now-a-days about world community, global friendship and the like, such talk is meaningless if the firm regional and local community is dissolved.

'By a community I mean a small diversified group of people, young and old, male and female, with different skills and abilities, living together as kin or neighbours. It is a face to face primary group, in which many of the major functions of life are carried on cooperatively within the group itself. It is a small group where people know each other as whole persons, not as specialised fragments and in which they have a sense of "belonging". This normal community has been the setting or matrix, in which human activities have taken place since immemortal time. To it the human being is adapted; he is indeed, a community animal. When this community is dissolved, human life breaks down biologically, morally, even intellectually and human education becomes futile. College education is one of the erosive forces that cause our small communities to wash away under our feet'.

I have heard some very highly placed educationists even in Congress ministerial circles say that they do not understand what a 'rural university' means. The learned members of the University Commission appreciated the idea so much as to include a chapter in the report on it; but these friends do not. A university is an institution for the advancement of learning and learning is universal, they say; how can you make learning 'rural'? These friends can swallow the idea of a Sanskrit university or an engineering university or even a Hindi Vidya Pith but that of a rural university sticks in their throats. Be that as it may, what answer have such learned educationists for this charge of urban superiority-complex and 'predatory ideology' fostered by the present day higher education according to Brownell? Can they deny this charge? If not, what other way out can they suggest except educational institutions run with a new outlook on life.

It will not make a university rural, if we build it over village lands, acquired at cheap rates from farmers. Banaras Hindu University was built that way; but a city has grown in and near it within the thirty years of its existence, linking it completely with Banaras proper. Roorkee was a small township. The Thomson Engineering College, meant originally for training only irrigation engineers for the Government, has developed considerably; and by the time the Engineering University is in full bloom, Roorkee will grow up into a city. It is not the location but the outlook

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that matters. The rural university means one, which has a rural outlook; one which does not prepare men for the services, or for ruling and exploiting others through capital, through intelligence or through their pens and files. It is one which produces graduates who will return to the villages, fired with the fervour of invigorating and enriching rural life, men who will help the villager to solve his problems and to progress towards more and more agricultural and industrial production.

It is however not absolutely necessary that such rural universities with a new outlook should be newly built. Vast amounts of money spent or being spent on our urban universities will be wasted and those universities will not be worthy of the salt they eat from the soil, if they did not change their outlook so as to serve also the interests of the 85% of our population in rural India. No doubt the psychological effects of surroundings and old traditions is very great. Hence with the present personnel and location, most existing universities will rather get scrapped than change their outlook. Then let us gradually scrap such universities as would not change, and build instead new ones in rural surroundings with teachers imbued with a new vision on life. It would mean a colossal waste of money but it would be worth while in the larger interest of the country.

Quite a lot of people dazed by the economic progress of the west, and guided by marxist theories, have a tendency to relegate the building of the right sort of personality in the schools and in the nation, to a relatively unimportant position. They think that given greater wealth, more leisure, and more education of the present intellectual type, character building will take care of itself. We here in India have seen, within the last hundred years, under the British rule, the growth of an educated middle class, possessing tolerable wealth and leisure either as government servants or as petty businessmen and small industrialists. The last war exploded the myth that this middle class had a moral backbone behind it. With the war and controls opening up numerous opportunities of unearned or easily earned income, and the fear of the state considerably relaxed (because the state was too busy and too much concerned about war effort to look to other matter) the satan that was all along alive in the hearts of the middle classes became active, kicking and wild in its devilish pursuits. The general impression is that during the Congress regime, that satan is taking full advantage of the change of regime and of the liberties which democracy brings. The Zamindar or the industrialist or the big captain of business may be dubbed as the incurable capitalist of marxist philosophy; no amount

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of education may remedy his greed; but what about the middle class well educated and fairly prosperous? Who has spoiled them? This example of our own history may not appeal to us because it is so close to us. Let us see what Morgan, an American, has to say on the point. While speaking of rural uplift in India he says, 'If these economic and hygenic advantages should be secured without corresponding development of character and culture, the change might be loss rather than gain. Pioneer American educators, pictured the achieving of universal literacy as bringing an end of crime, and the coming of the phonograph and the radio as giving universal access to great ideas and thereby ending triviality. Such results have not necessarily followed. Universal literacy, high income and much leisure sometimes find expression in going to crude movies, in reading comic books and in listening to puerile radio entertainment. Integrity and good will in human relations, simplicity and self discipline in living and appreciation and respect for cultural values, difficult as they are to secure, must be assumed to be a part of the picture of the good community. Economic, cultural and ethical education must go together'. A. J. Toynbee an American historian asserts that we 'can not escape the moral choice. It lies in wait at the end of every path. For, each new instrument we conquer, intensifies the effects of our virtues and vices. Every new scientific achievement offers a further test of our spiritual powers. So do other kinds of technical advance. Once universal education was considered in itself the means for realising peace and progress. But we found that the yellow press came along in England just twenty years after the first batch of children had been taught their letters in the first free schools. It perverted the results of education by popularising sensational news—Looking back over the twenty-one civilisations I have studied, I am not sanguine about man's ability to make a good moral decision if he aims at a worldly goal. Love of mankind (he is evidently referring to the love of mankind, as advocated by the modern humanists as a force working for human moral evolution, in place of the old ideal of love or fear of God) has been a force in history—but only when it was a byproduct of an intense love of God—The great need of the modern world is a rebirth of supernatural belief. Without it man-unregenerate man—is hardly to be trusted with the dangerous toys his laboratories have hatched'.

Ethical and cultural education is so intangible and so difficult to impart; we have not the proper type of personnel to start it; therefore it had better be left over. This is the stock argument in favour of allowing things to drift. People forget that inspite of equal and even greater diffi-

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culty and intangibility we have tackled other fields like poetic and artistic talent, literary criticism, technical skill, inventive faculty, research mentality etc. etc. We provide in all these cases a general back-ground on the physical and intellectual planes; we supply the atmosphere for the growth of these high qualities of head and heart; and we amply reward the men of genius whom we happen to discover. The general results may be low as compared to other fields of purely factual education. There is nothing to be surprised in this; for you can only encourage inner greatness by such external stimuli; you cannot create it. All the same we get in the cream of the universities some men who exhibit these high qualities in an abundant measure. We have witnessed before our very eyes the experiments of Mahatma Gandhi. He built up the character of the nation and created the urge for independence. He built up the morale of the Congress by providing the thorny path of service and sacrifice. He started Ashrams for consolidated efforts at all round character building. Today it is not the Congress that rules India, but the character traits of liberal political sense, selfless service, and energetic drive, which Bapu impressed on its organisation; it will continue to rule only as long as these traits continue to characterise the Congressman in a sufficient measure. It is a well known secret that it was not so much the British Government that ruled India as the character formed on the grounds of Eton, Harrow and Rugby that did it. Still we persist in thinking that character building in educational institutions can be postponed with impurity. Building of the body even is, by the way, not easy—though not so difficult as the traning of the mind or the cultivation of correct emotions; so many factors—heredity, care in childhood, environments, climate and nutrition—all contribute towards building of the body. We know this; we know that without proper eugenic planning of society, and without providing adequate nutrition, all attempts at building of the body are a mockery. Yet we spend huge sums of money on games and gymnasia; we appoint teachers for physical instruction and our daily papers idolise the sportsman. We do it because these are the only things we can do at present in that direction and we are producing the correct atmosphere for a well built body. In ethical education, however, we would not be content with such small beginnings; we want either the whole or nothing. The subconscious argument at the back of our minds seems to be that the British have not yet done it, hence it is no use our attempting it. The British have left but the spell of their ideas and practices is still on us. The British may not have attempted it in their ordinary schools and colleges; but they have public schools at Eten, Harrow etc. for the

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building of character in their own way. We imitated them at Dehra Dun and elsewhere forgetting that the character traits we want are different. The British wanted a handful of men for governing their colonies; we want the whole country to be morally and culturally elevated. Our methods must be cheaper, more wide-spread, and broad-based; we must train men for leadership in democracy rather than for imperialistic power.

The intellectual man has a tendency to be timid, over critical and over cautions. Imitation becomes the natural consequence of such an attitude of mind. The burden of books, of what has happened or what has been said in the past prevents, like a dead weight, new departures and revolutionary changes. What those revolutionary changes or new departures should be, is enough matter for another article. In this I will content myself with breaking *shibboleths*, old as well as new, and with indicating the dangers of blind or indiscriminating imitation. With a fresh political and economic situation created by independence, we must think afresh and be prepared for entirely new adventures in education. 'For several reasons', says Morgan, 'the existing university system of India is ill-suited to the task of furthering such a transition. In so far as it does have a democratic concept, that concept is not to share the common lot of the common man, but to give an equal chance to all able men to escape from the common lot into favoured positions, as in the professions, where they can demand the services of less favoured persons, treating them as of a lower order of humanity. The universities face towards the city and not towards the village.....The roots of university interest have been in foreign cultures and not in their own. They should be grounded in both world culture and domestic culture. The universities are too much interested in degrees and in access to public positions. To only a limited extent do they stimulate students to self-reliance and initiative, in undertaking work within their own reach and their own powers. The universities are too much concerned with theory and not enough concerned with learning by doing. They are too much concerned with learning from books and too little concerned with learning through the normal course of living a full life as a member of a normal community'. If this criticism of our higher education, as seen and described by an American educationist is correct, would anything short of revolutionary changes suffice. Our educationists are still content with merely prescribing new text books, adding new subjects. This is merely playing with reforms. Even the University Commission report appears to be suffering from the same defect of timidity. It has merely added a chapter on 'Rural Universities'.

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It is not only in India that new departures are needed. World is advancing so rapidly every where, that educationists must keep pace, shake aside their proverbial conservatism or otherwise they will kill the very cultures they created. Dorothy Canfield Fisher describing projects in America based on the pattern of Danish Folk Schools of Bishop Grundevig says: "The danger in the case of the situation of the adolescent youth of our country is, that the emergency may not be recognizable enough to call out that bold, fearless grappling with the new, that conquering of the unexplored, which in other fields of effort has been traditional in America. Our professional educators alone cannot cope with the emergency. No educators could.....The imagination needed to transform our secondary schools to meet our new urgent demand on them is of a quality which can be nourished only by the national blood stream. To graduates of normal schools, of university courses in pedagogy, to those who have won high academic degrees in graduate study of school systems, to earnest, sincere devoted, gifted practitioners of the great art of teaching, the quick shifts they have made from Greek and Latin and literature to shop work and home economics and pre-aviation courses, probably seem as revolutionary a transformation as is imaginable. But if Bishop Grundevig of Denmark could look in on them as they hurriedly change one kind of subject taught in class-rooms to other kinds, the great old man, who fired the hearts of his people to turn disaster into triumph, might think they look like nervously conscientious housewives, the morning after an earthquake, dusting their tables and sweeping their floors, in a house the walls of which are cracked from roof to foundation. He would not blame them. But he would blow a blast on his trumpet to summon the nation—to do what they cannot do—to reconstruct the house'.

Mahatma Gandhi desired to reconstruct the entire system of primary education on the activity principle, correlating even ordinary school subject to that activity. Morgan sees in this concept a philosophy which is applicable almost from the nursery to the university. 'Education should largely consist of the practice of living'. He would give a large amount of freedom to individual teachers, schools, communities and provinces to experiment with various methods and combinations of learning from life and learning from books.....'it would seem to be wise to give most of the time and effort of teacher training to the process of learning from living'.

This is too revolutionary for a land of stereotyped courses and syllabuses reducing the teacher to the role of a cog in the wheel, of a mere wage earner. Hence it is that even with such a big name as that of Mahatma Gandhi,

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behind the idea, it has not caught the imagination of educationists yet. The English public schools, which manufactured for Britain, the rulers for the colonies, are characterised by freedom from stereotyped rules and courses, greater initiative for the teachers, more intimate contact between the teacher and the taught, and an emphasis on character building at least as strong as on learning. These essentials of a correct educational atmosphere we neglect, but we maintain the schools still. We throw aside the essence and preserve the form.

In the pursuit of 'learning through living'—Morgan is prepared to cut down the periods or days of work at school to half, leaving the rest to the child for learning through actual life. 'There is some interesting evidence to the effect that children learn much more than half.....in short study periods than in periods twice as long. The learning process seems to continue in the subconscious mind when the attention is on other matters... They (the children) would have less stress of physical impisonment, which, in my personal opinion, is one cause of maladjustment in America. They would be getting informal education. Lastly with a given public expenditure, the whole of India's children could be reached, nearly twice as soon' (Morgan's article in 'Harijan' of 8. 5. 49).

Antioch College in America has carried the principle of learning by doing, even to the university stage. It has abandoned since 1921, the conventional four years university course and has adopted the work—study scheme and a five years course. Every student spends about two or three months every year as a trainee and an employee for getting practical training and also (in some cases where there is lack of social qualities) for making himself a complete man. The nature of the training is chosen by the student under the guidance of his teachers who have a complete record of his work and psychological make up. The employers do not dislike these trainees who are also employees; because this method gives to both the employer and the student intimate experience of each other. Most students choose their occupation well before they graduate and get a welcome call from some employer immediately they have finished their examinations. Antioch College is now famous throughout U.S.A. Inspite of only 120 weeks of study spread over five years—as against 144 weeks spread over four years in ordinary universities—the graduate of this College fares well in comparison with other graduates. There are much less chances of his remaining unemployed and the psychological shock of the sudden change from the university atmosphere to that of a farm, factory or business house is entirely eliminated. The teachers watch every undergraduate

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and if he lacks some social qualities, he is sent for training in situations that would correct him. Mental angularities must be rounded up before it is too late and complexes must be softened before they get ossified. The aim is to manufacture a complete man not merely a graduate, one who would lead as far as possible an integrated life in the world as it is (From a description of Antioch College given in 'American Education' of 6. 12.48).

I will end by quoting again from the American historian, A. J. Toynbee, who bases his contentions on his study of twenty-one civilisations. He has some very startling disclosures for those who pride themselves on their national cultures or their glorious heritage. He has a warning also for those who want patriotism and narrow nationalism to be inculcated in our schools and colleges, so that the educated youth may contribute to build a strong and united nation. With the advent of independence, there are several warring cults prevalent in our country, each struggling for ascendency. The followers of some of these ideologies, if they had their own way, would convert every educational institution into a seminary of conservatism and revivalism, and would inject its vaccines in strong doses into the mental stream of every student. On the other hand, the educated Babus of today, the graduates and supergraduates, the officers and the Sahibs, if not subscribing to any narrow mentality, imitate the narrow nationalism of Britain; as if any superiority complex, even political in place of religious, can be justified. Britons, who only till the other day were fed on nursery maxims like 'the Sun never sets on the British Empire', or 'Rule Britannia, Britannia rules the waves, Britons never can be slaves', find themselves reduced to a third rate power in the world; their empire is dwindling and their naval supremacy considerably lost its importance with the development of aerial warfare, atomic weapons and guided missiles. But it is the lot of imitators to wear out-worn clothes and to follow discredited ideals. The Socialists and the Marxists think that they are treading on surer grounds. Their doctrines are fresh; they are based on a 'scientific' study of history on the lines of Marx. With the communists, marxism is influenced and guided by mandates from Moscow, the only accredited interpreter of this new economic gospel. Gandhi himself was elastic and progressive; but his teachings stand the same danger of being reduced to a cult. Toynbee has some very hard words to say about all such cultists. Success is no sign of virtue; success of a political idealogy for a brief period of history is no justification for its being made into a cult. Gandhism has succeeded. So has communism and wonderfully too; it has encircled half the world in its iron grip. Jinnah's idea of muslim nation has also

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succeeded in our own days; so did for some time Hitler's Reich, Mussolini's plan of the Roman Empire and Japan's Empire of the Rising Sun. You cannot judge between idealogies on the basis of their temporary successes. We should never forget that credulity is as bad in politics as in religion.

'Nothing fails like worldly success', says Toynbee, 'my study of twenty-one civilisations has convinced me that cultures are healthy only when they are creative, when they are responding with a fresh, creative response to some challenge of climate or immigration or internal change. The civilisation that solves its problems and rests on its oars has a sad future if it does not respond to the next challenge with a different answer'. The acid test of true education is not in knowledge piled in the brains or cults religions or political ideals injected into our hearts, but in cultivating this habit of creative thought and pliable emotions; so that we face each new situation with a suitable response and yet we do not develop individuality and individual thinking so disproportionately as to make social cooperation or organisation, weak, difficult or impossible. Does our education answer this test? If not, what are the remedies to be applied? Or shall I say, revolutionary changes to be made? For the situation appears to demand them. The world of ideas is moving rapidly with ever increasing pace. Who could have imagined twenty years back that *Satyagraha* could free an unarmed nation or that empires which succeeded in war would liquidate themselves almost the next day? Who could have dreamt that a cold idealogical war like that of the communists could effectively work as the advance guard of marching armies? Yet all this has come true. We must keep our eyes open and be prepared for revolutionary changes and new departures. 'Today we are endangered', says Toynbee, 'by our mastery of the machine.....Patriotism.....is a modern passion that hardly existed before the French Revolution.....Patriotism has become the modern substitute for religion—and a very bad substitute to my mind.....Our recent scientific progress was a creative answer to the challenge of industrialism and a fine one. But the problems that we now face are not of a kind that will be answered in the laboratories. They are moral problems and science is a moral. The challenge of 1948 is clear. How are we going to employ the physical power our scientists have gained for us? If we try to answer this problem by the old response of piling up more and more scientific knowledge, we shall be heading for a grave disaster. Using an old successful response to meet a new demand is one of man's greatest temptations; but it rarely succeeds.....History shows that civilisations which have depended on military prowess to survive have fallen; a soldier's skill will not solve

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the problems that victory brings.....Life is not that essay. A single formula for success cannot be written. Every new challenge demands a new spontaneous response from a man or a sociaety. But man is lazy... it is hard for modern man to give up his hopes of finding a materialist solution to the problems of the world.....But it cannot in the nature of things..... Man has been very clever in gaining control over nature. But he is very backward in learning to control himself.....the problem demands a spiritual change in modern man'.

Patriotism, national pride and a glorious historical past are not unmixed blessings; they can be the cause of downfall. The glorious city states of Athens, Corinth and Sparta in ancient Greece could not federate owing to their city pride; while similar city states in Syria, Egypt, Carthage and Italy, which had no histories, federated without difficulty. Greece with its glorious culture declined while these younger novices grew in strength and importance. 'Today the unification may also be brought about by citizens of countries which have had no proud record in the past few centuries. If the greater powers stubbornly insist on clinging to the old concept of nationalism.....people who have not found nationalism a happy experience may be the only ones who can give the world the fresh solution that it needs. I suspect that the coming people in the Americas may be the French-Canadians; and in Asia, the Chinesc'. He does not think of Indians; we are so conservative, so slow to think anew. Let those who plan education for the future in our country behold which way the winds of history blow, and beware.

I would conclude by a very startling disclosure of Toynbee. 'Certainly our recent efforts to solve our problems in strictly materialistic terms have failed and made caricatures of all our brave plans'. Inspite of our labour saving machinery and emancipation of the gentle sex, 'one of the odd results of this progress is that women today are overworked as never before'. Wives can not afford to keep servants, they must add to family income by earning in order to maintain a decent standard. 'As a result the woman of today does two jobs; one as wife and mother in the home; one as employee in the office or factory.....such a trend is not a hopeful one. In history the ages of disintegration were usually the ages in which women had left the home'. (A. J. Toynbees article reproduced in the Harijan of 3. 6. 50). Blind imitation of the west will lead us also to the same situation. Let all and particularly those who plan female education be on guard.

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I SEEK THEE

Shri Kailash Nath Tripathi,
(3rd Year Arts).

O Soul of my Soul!
I am questing Thee.
Dragon of unplumbed darkness devours the day;
A trance upon the creation inaugurates the paramount sway;
Crawl in the ether echoes of terrorizing voices in continuence
Gentle wind of Malyachala is heaving through tender blossoms in pursuance,—
Of Thy foot-prints.
O Soul of my soul!
Where Thou dost reside?

× × × ×

O Conscience of any conscience!
I am searching Thee.
For Thee, yes, only for Thee, I proceed though eyes dozing;
Crickets chirp and lily her secret exposing,
Leaves are rustling while screeching bat,
And
Smiling innocent stars on firmamental mat;
I have glimmering candle of Love.
O Conscience of my conscience?
Where Thou dost abide?

× × × ×

O Creator of creators!
I am thirsty Chatak of Thy Grace Swati.
I am seeking Thee in river-ripplets;
Traced is not Thy smile, in flickering starlets;
In auriferous clime of meditation Thou art not seen.
Thou, Thyself dost say, O my Master!
Where Thou art?

× × × ×

Gust of wind from far off whispers,—
I have seen,
O Seeker seek; seek with more zeal
Where nobody seeketh
In the midst of forlorn.
Now my soul is quivived,
I am on the way.

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NEEDS AND WANTS OF HUMANITY

Shri P. D. Mahajan,

There is a very wide difference between the needs and the wants of Humanity, and we are so prone to include our wants with our needs, that we are often unable to distinguish between the two. But the ever increasing cry for change in the condition of affairs, that is being heard as well as felt, includes both the needs and wants. The vast majority need something else and they are beginning to want it.

The most appalling thing in this life is the amount of unhappiness that confronts us on every side, not only poverty and disease but the want of any true happiness. Look around you one of these beautiful days, and everything in Nature, except man is teeming with life and joyousness. Look well into the lives of your friends and acquaintances—is there one you would change with? Everyone has some skeleton, some condition of mind, body or estate that offers his share of those things that seem to be desirable, most of the lives are a "striving and striving and ending in nothing." Some writer has said that "we long for things, and would give all we have to touch them, but we never reach them. Then at last, just when we don't want them any more, when all the sweetness is taken out of them, then they come, and we don't want them". This is the way most people feel.

Surely life ought not to be as a dry, empty husk; we are not the plaything of an everchanging, irresponsible fate. If through ignorance and ill deeds we have come into this hopeless, disappointed state, is there not some way out of it? There is, deep down in the hearts of all, a hope, a feeling—dim perhaps and undefined, but still there it is that there must be something better, else the grave-yards could not hold the suicides.

If poverty and want were the only cause of the unhappiness, there might be a chance of alleviating a great deal of it. But all the world is not hungry and cold, and it is the other class who are disheartened and want something more. Why do people pursue ignoble aims and give full play to their lower impulses, and sacrifice their lives to attain small objects? Is it not because they consider life from the standpoint of the person, which is too small and contracted to admit the larger hopes and aspirations and energies? How can one, thinking of himself as something insignificant, perform that which is great?

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What men need is to realize the existence of a soul, to begin to look at life from the standpoint of a soul. There is power in the very conception of a soul as a factor in human life to stimulate the discrimination, thereby enabling one to choose nobler and broader lines of action. The lifting up of the hands brings no salvation; redemption comes from within. It is wrought out by the soul itself, with suffering and through time. And although each man must work out his own salvation, they all need help and encouragement. They must have the idea kept before them that "Life is Joy", and when they begin to think of themselves as Souls, they will realise the joy in the knowledge that every earnest effort to overcome their weaknesses and the well doing of every duty, is a stepping-stone to higher and nobler effort. "Greatness is to take the Common things of life and walk truly among them. Happiness is a great love and much serving".

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THE TONIC OF THE DAY

Shri A. S. N. Sinha, B.A. (Final).

You are looking depreased, dejected, not feeling well; you are runing to a doctor for some good tonic. It will cure you only temporarily. You are taking the wrong tonic. Many of you take the wrong tonic. It is the mental tonic which you and many of you require. Have you heard of this tonic? It is very cheap. You cannot get it at a druggist's shop. It is with you, you have got it yourself.

What has gone wrong with young men and women of to-day, with the young students of to-day, the would-be leaders of our nation? They are dejected, hopeless, energyless, doubtful and timid. They are looking up advertisements for rejuveniting pills. Alas! if they could know and specially my friend you could know that the pills are with you. You can make your life full of energy, enthusiasm, hope and power if you could take the new tonic every morning.

You know that you cannot jump over a two feet wide ditch, but when you were chased by a bull, you ran for your life and unknowingly jumped over a four feet wide ditch. How did you do that? You must agree with me now, that there is the extra energy and power within you, which gave you strength to jump over it. We all have that power and you are no exception. It is the Adermin gland which supplies extra energy.

During your meals if you get angry your digestion will stop, that is what experiments in Psychology have proved. This is true with other emotions also. Every negative thought which makes you dejected and energyless is injurious to your health and happiness. You cannot achieve anything under such a state. How can you? When you are talking of failures, doubts, worried of the future, every bit of your cell in the body is being affected by it and becoming energyless. Your subconscious mind is taking it up and making more stuble impression upon you. You do not know the mystery of this subconscious mind. Have you ever felt or had to face a tiring problem, which you could not solve? Then you went to sleep in the night, the next day you found the solution. You do not know how it really happened, it amazed you. It is the working of the subconscious mind. So with your useless thoughts, you are continuously making an out-suggestion, a suggestion to yourself, that life is hard, useless, hopeless and not worthliving for you. Certainly you feel sad, and look gloomy, then how can you achieve anything; no one has been successful when he has been talking of failure. The failure is stamped on your face.

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For your ailments also you run to a doctor, but he cannot give you that tonic, which you have yourself. More than any drugs in the world the mental tonic has cured many, take this tonic.

If you are worrying stop worrying, many men and a women like you have narrowed their lives by worrying over what may happen tomorrow. If you are feeling gloomy, sad and dejected, take the first dose of this tonic i.e. smile. Smile my dear friend, force yourself to smile and laugh and you will find the change in yourself. You will find the positive current working in your system, it will make you happy and healthy. There is lot of truth in James-Lange Theory of emotions; if you are running away due to fear, stop runnning and a great deal of fear will vanish.

If you say things are bad with you, well remember nothing is good or bad; it is our thinking which makes it so.

Every morning when you get up take the first dose of the tonic, that throughout the day you will smile and laugh at your troubles one by one. I will give you all the doses. Brake up yourself, look smart and do not feel inferior to anybody; the only inferiority in us is what we put into ourselves. Affirm what you want to get an achieve. When you go to sleep, suggest your subconscious mind rather yourself, that you can do what you want and you will do it. This powerful affirmation will create great energy and strength to achieve great things.

Now! you act upon your affirmations, with full faith in yourself. Never allow any negative thought, any doubt; it will ruin the effect of the tonic.

You will feel healthy, cheerful and lively if you take this tonic everyday. Life will become heaven for you. Try it, but remember you must be regular and have full faith, without full faith no medicine will act on you; it is a psychological fact.

If you want health affirm health, talk health and ultimately with a smile on your face you will be improving your health.

You will get it what you want.

Only take this medicine everyday and stick to it. It will cure you of all your ailments, it is a better tonic than you can get at a druggist's shop.

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SHOULD STUDENTS TAKE PART IN POLITICS TO-DAY?

Shri Chandra Shekhar Nath Tripathi,
B.Com. (Final).

"What is literary training worth if it cramps and confines us at a critical movement in National Life?"

In ancient days the duties of the students consisted of reading of scriptures, Text Books, Scholastic pursuits and learning such Sciences as constituted advancement of humanity both materially and spiritually under the full guidance and control of the Guru. By reading ancient scriptures the *Ramayana & Mahabharata* one gets a vivid picture of the life of a student in those days. Side by side with other subjects study of Politics formed one of the chief studies. But we cannot find any instance where students of those days took an active part in the politics of the country. Wars were fought and kingdoms upturned but life of the student remained much the same. He was hardly affected by the changing politics in the country.

Influence of Foreign Rule

Later on, with the advent of foreign rule in this country, things could not remain the same. The alien rulers did not like the students to cultivate a free spirit and purely scholastic ambitions and live in the glory of their past traditions and culture that was the heritage of ancient India. They soon started to cultivate the mind of the student in a particular channel and all his activities were directed with only one end and view, e.g. tightening their strangle hold on the country. As a first step, curriculam of studies was drastically changed by Lord Macaulay, and English became the medium of instructions. Gradually the students started forgetting the high traditions and the glories of India and soon imbibed foreign culture with all its evils and goodness if there were any. But if such an education had its evil effects on the general trend of the mind of the students, it also had some advantages. It widened the general outlook of the student and brought him in contact with what the students in other countries of the world were doing. This soon inculcated in the students of the country a spirit of national outlook and a yearning to occupy the same status and dignity as enjoyed by the students of the free nations.

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Renaissance

A renaissance had set in. The students found their ideal in Lokmanya Tilak, Malviyaji and Gandhiji and started reading politics of the country with an avidity and zest unknown in the student world before. At this time the political leaders were not unanimous as to whether students should take part in politics or not. But in 1919 during the non-cooperation movement Mahtama Gandhi openly asked the students to leave Govt. Institutions, join his movement and take an active part in the politics of the country which so far they were looking at only passively. He had rightly urged, "I think it is students' clear duty to take a leading part in the political movement of their country. They are doing so all the World over. In India where political consciousness has till recently been unfortunately confined in a large measure to the English educated class, their duty is indeed greater. In China and Egypt it is the students who have made the national movement possible. They cannot do less in India". The history of those times need not be retold. The activities of the students went on widening and to-day the country is full of students' unions and federations and the student community has played no mean part in the achievements of freedom for the country. "Nothing in history is like the 20th century and nothing in 20th century resembles the present times". A consciousness has come to the student community not only in India but the world all over.

In other countries

Students played active part in getting the country free from the shackles of tyranny and medieval ideas in Turkey. There Mustafa Kamal Pasha had newly won independence for his countyr. It is doubtful if he would have achieved his object without the active cooperation of the Turkish youth. The foundation of the Nazi, and Fasist movements in Germany and Italy was laid by the youth of those countries and both Hitler and Mussolini rose to power by virtue of having captivated the hearts of the student community. We here do not want to discuss, the justice or injustice of these movements but one thing will always remain true that the youth of these countries had raised Germany and Italy to the pinnacle of glory, and fame, and this is what we are concerned about.

It is only the country's educated and intelligent youth who can once more raise this country to occupy the position amongst the comity of nations—an object of inspiration, example and admiration to be followed

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by others. They say that example is better than precept. How can the students achieve anything good for the country, unless they were prepared themselves for service and sacrifice; mere reading of books and knowledge can never be conducive to the advancement of a nation unless such knowledge is translated into action. The majority of the population of India consists of illiterate men; and who is better suited than the student to propagate knowledge, and ideas amongst the illiterate masses? The student being young, educated and intelligent has all the necessary qualities to undertake this ardous task, for who else is better fitted to undertake this colossal task if not he. It is an absolute truth that no country can make any head-way unless the masses were emancipated and self-conscious. It is true that India has achieved freedom to-day but to keep this freedom intact the whole nation will have to make an effort. A handful of educated men or even patriots cannot guarantee the freedom for the nation for the future generations unless the masses took an active part themselves in the affairs of the country. Therefore, Gandhiji had advised students in the past and our leaders advice to-day that students should go into the remote interior of the country even at personal sacrifice to educate the masses and make them actively interested in the burning problem that faces the country to-day. Gandhiji had said, "The function of educational institutions is to impart education to the boys and girls who choose to join them, there through to help to mould their character, never with their political activities. The students cannot be away from politics. Politics is as essential to them as religion". We may here mention that Pakistan owes its existence to some extent to the activities of the Aligarh University students who went to every nook and corner of the country to incite the Muslim masses of the country to demand a separate homeland for Muslims of India known as Pakistan. Whether they did right or wrong we are not concerned with but the fact remains that Pakistan has been brought into being greatly through the efforts of the Muslim students community. We have merely cited the example to show how even the impossible could be achieved by harnessing the energy of a handful of youths.

Struggle of Freedom

The political upheavals of 1919 and 1942 will ever remain hall marks in the country's struggle for Freedom, and with the above movements the section of the student community which is freely associated actively with the spirit of the country's national fight for freedom stands out like a monument—an example of service and sacrifice in the cause of India.

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The action of the students had various repercussions in the country's political field. Leaders like Gandhi and Nehru applauded the spirited action evinced by the students. It is therefore very surprising when to-day we are told that active participation in country's politics should not form the sphere of students' activities. We are advised to improve our knowledge of politics only theoretically but we are not to put this knowledge to use.

Virtue is defined as exercise of certain noble qualities, for example charity, benevolence, truthfulness etc. A virtuous man is one who exercises one or more of such qualities. Mere knowledge is not enough. Mahatma Gandhi did not become the idd and the ideal of the hearts of millions throughout the world, because he preached honesty, service and sacrifice etc. There will be found many who will say hundred times more than what Mahatma Gandhi said with greater force and vehemence, but why don't they become Mahatmas or Leaders and why don't they have equal hold if not more upon the masses? The difference lies in the very simple fact that Mahatma Gandhi never spoke a word which he would not put into practice. His life was like an open book. He had nothing to hide from any body. He was always prepared to brave the dangers and trials of life himself which he would advice others to follow. He never asked any one to do a thing which he was not prepared to do himself. What is the use of knowledge if it cannot be brought into use in the service of humanity or in the cause of the country?

Absurd Plea

To say that the time is not ripe for students to participate in the political field is quite absurd. India to-day is worse situated than it ever was. To achieve independence is difficult but to maintain it is hundred times more difficult. Every citizen of free India must do his bit for the maintenance of hard won independence. The student community who has shared in the struggle must not be an idle spectator when a crisis threatens India to-day. The slicing away of territories from this country into what is now known as Pakistan and the upheavals first in Western Pakistan and then in Eastern Pakistan and with Kashmir Problem facing up to-day as we know it has brought home to us the true reality of the state of affairs which threaten our motherland. To-day it is a problem of life and death which faces India. To-day in this atomic age the atmosphere is surcharged with possibilities. There may be a war or there may not be a war but it is true that we are passing through a crisis. Should the student community fail the country in this hour of trial?—No, never. Students outside

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India and inside have taken part in Politics in the past, and must do so when the country is threatened. During the last World War students in Britain, Germany, France and other independent countries left their studies and joined the army to help the War effort of their countries. In the very remote past, history tells us, that even Socrates who is called the father of Philosophers took to the field when his country needed him; such men were indeed actuated by the highest motives of service and sacrifice in the cause of their countries.

Certainly India to-day is not passing through easy times, and unless the intelligentia of the country particularly the student community plays its full part in the political field, the hard won independence might not have been won at all. The political leaders who want to lull the general public into the belief that there is nothing to worry about and peace reigns in India are misleading the country. It is they who do not want to see the student community in the arena of politics. It is because they are afraid of losing power and hold on the masses; only time will tell. But the student community by virtue of being educated should stand on its own legs and decide its future and how far it should join in the political field. It is agreed that the duties of the students lie in the sphere of education, and politics should be outside the scope of its active participation. But this should hold good for normal times. But we are passing through abnormal times and what holds good for normal times will not hold good for abnormal times.

On the battle field of Kurukshettra when the contending armies of Pandavas and Kaurwas were fighting and the commander of the Kaurava forces Bhisma was playing havoc with the Pandeva army whose adviser was Lord Shri Krishna, He seeing that Arjuna was not able to withstand the terrific onslaught of the Hero Bhisma, himself jumped into the arena (intending to kill Bhisma) and broke his vow of not actively participating in the War. Surely there were some deep motives which made Lord Krishna break his pledge. He saw that it was a critical moment, and he must join actively in the struggle. Such an abnormal time faces India to-day, and the student community must rise to the occasion and actively take part in politics and not be simply onlookers which would be suited only to normal times. It is thus clear that there can be no two opinions on the subject. Students must and will actively participate in Politics.

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SHORT STORY

Shri U. Ramdas Kalkur

(3rd Year Arts).

It was summer and I had returned home. The one news that had made me anticipate a happy summer at home was that Gopee would be staying there. His protracted stay at Madras for medical treatment had separated us for reasly three years. He was my boon companion in my boyhood days. But when I went to see him on the very day of my arrival at home, he gave evidence of some acute mental grief, which seemed to oppress him day and night. He was not his proper self. Though I failed to discern any mental aberration, it was bruited in the neighbourhood that Gopee was off his head.

His parents could not think of any cause which had driven Gopee to the verge of madness. They tried their best to find out the cause from him, but to no purpose. Gopee's father feared that Gopee's continued worry might, at length, fairly unsettle his mind. Thinking that the cheerfulness of my company might help in mitigating the chronic misery of his son, Gopee's father asked me to give his son my company. I agreed forthwith, confident that my friendship with Gopee would admit me into the recess of his mind.

Gopee made a bad company. His spasmodic gaiety was conspicuous by its absence. I could perceive a bitter disappointment imprinted upon visage. I had always known him as a garrulous man of exuberant spirit, and I could never remember him so dejected ever since I had contracted intimacy with him. Like a reveller in drugs, he at times, sat in a corner, abstracted and evading all my questions with prevaricated answers. Sometimes, an unaccountable fear would seem to grip him. He would burst into tears, shivering all over. Staring at me with his red, dilated eyes—and this used to create fear in me—like a man possessed, he would scream : "This is a prison, a prison".

This unusual behaviour of Gopee dispised me to believe that something serious was weighing upon his mind. I could not for my life conceive of any bad act which might have upset his mind, because I had, and still have such an implicit faith in his character. I knew Gopee to be a man of integrity and character, but who knows what may happen in this puzzling

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world and how men may change under certain circumstances and situations ? Temptations are so many and even the most impeccable characters often, in a weak moment, submit to them. My faith in Gopee underwent a modification when I thought of this.

"What makes you so distressed" I asked him one day, determined to make him divulge the secret.

"Why worry about me" Gopee replied, getting a little impatient with me. "I avow myself a sinner and the sinner's recompense is sorrow".

These words set my back up.

"Damn your reticence ! what the hell do I care for you ?" I retorted and left him away, putting on a semblance of anger.

Next day early in the morning, Gopee had sent for me. This was not unexpected. When I went to his house, I could see his mood slightly better. He was like a person relieved of the burden he had long borne.

"You have not been so foolish as to take offence at my inadvertent words yesterday" said Gopee.

"Certainly not" I replied "I only thought it prudent not to exacerbate your temper, and so deemed it proper to take leave of you. But your attitude admits of no excuse. You cannot keep the secret for long. The sooner you disgorge it the better for you".

"It is a long and unedifying story" Gopee began "when I was in Mangalore, studying for a degree, I developed the symptoms of heart trouble. I paid no heed to the disease, until I was confined to bed. My father, alarmed at the news came to Mangalore and took me to Madras for medical treatment. There I was under the treatment of a specialist who hailed from a village in the vicinity of Mangalore. With the passage of time, the acquaintance between my father and the doctor matured into friendship. When the monsoon approached my father returned home, leaving me to the care of Srinivas, for that was the name of the doctor".

"Seenu, as I used to call him in a familiar way, was a man of kind and lovable nature. Were it not for his loving care I should have been dead long ago. Ever since he began to treat me, he was remarkably assiduous in his attention to me—an attention which, in a man of his vocation, I should have thought altogether odd. I was under his treatment for

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complete two years, save for a fortnight of his absence in connexion with his marriage.

My protected stay at Madras made me home sick. Ever since my father left me I had not much information about my parents. For some unknown reason Seenu withheld all news from me. "They are all well" was the usual reply to my questions concerning my parents. On my recovery, I requested that I should be sent home and so a day was fixed for my departure.

"At last the day of departure was upon me. I could not endure to think that separations had come between me and Seenu, whom, of late, I had come to consider as my foster brother, whose great affection for me is still enshrined in my heart. So my exuberant joy of returning home was not altogether free from a tinge of sorrow".

"When I started for the station, Seenu accompanied me. Neither of us could pronounce a word, for a sense of sorrow gagged us both. As Seenu accompanied me to the station with a rather heavy heart, he taked up smile to cheer me up. That very smile indicated the depth of his feelings towards me. As the train steamed off the station yard, it made me still more realize the link of affection that had been forged between us. Tears beaded in my eyes".

"I came home. My days here became dreary. After a short period, I went away to Mangalore to continue my study, interrupted by my illness. At Mangalore I was loving a girl. Her name was Mohini. But a great shock was awaiting me. One day, Mohini's mother informed of her daughters marriage by way of regretting my absence on the occasion. I took the news cooly, a mortifying sense of despair wringing my heart".

"On the very first day I had sensed a lack of cordiality in them all. I realized the reason for it when I was told about Mohini's marriage. She was a new Mohini, dignified and proud. It is common, that newly wedded girls should, with their initial adoration for their husband's acquire a disdainful attitude towards the very young men whom they were once mutely admiring. Mohini seemed to hate me with cold contempt. So I stopped visiting her house, thinking that time would alleviate my pain".

"Days merged into weeks, but my distress did not abate. I had loved Mohini as a husband who passionately loves his wife. I had always thought her as my affianced bride. and for years I had lavished upon her

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the best in me. This love had enriched my life. The life divested of this love was an awful box".

"A sense of bitterness never left my mind. I began to hate Mohini's husband. I did not know who he was, nor did I care to know either. He was the main cause of my unhappiness and that was enough for me to hate him with bitter hatred".

"Terrible ideas began to fill my mind. Life could not be lived without Mohini, and to have her meant that some one else must leave this world. This very thought, for a moment, made me shudder, because that meant murder—whose murder, surely of her husband".

"One day, on my way to the college, I heard that Mohini's was expected that evening. The news chilled me to the bones and revived in me all the bitterness that I had been suppressing all the days. All day long his memory corroded my mind. An intense, unreasoning hatred surged in my heart like a billow and seemed to batter against the walls of my heart".

"It was rather late in the evening when I returned home. Worried as I was in my mind I could not get a moment's sleep at night. The hatred had roused such a strong agitation that I could not find even a moment's peace. I lay wriggling in the bed, all the despicable recollections of the past days thick upon me. The chill air floating through the window heightened my pains and gave the bitterness its intensity. It was borne in upon me, as it never was, that either I should see the end of Mohini's husband or prepare for a life steeped in abject misery".

"To arrest such ghostly ideas, I went and peeped through the window. The night was scowling darkly upon the earth. Everything had mingled into a single impression of darkness—a darkness in which I could see strange and grotesque figures, like spirits, wafting along the wind in an aimless abandon. I feared they were ghosts".

"I stepped back, shutting the window. Drawing the bed clothes over my face, I tried to sleep. With my closed eyes I espied the deuced figure of Mohini's husband, hovering in the air like a spectre. He stared me in the face with impurity. He mocked at me, jeering in a diabolical rivelry. I could not endure this affrontery. Hatred burned bue in me. I swore vengeance and leaped out. There was non, woe betide him!"

"As the night deepened, my agony also deepened I determined to take vengeance—a vengeance drastic and condign. My misery had reached a pich at which all the milk of human kindness in me was drained".

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"I got up and snatched at the shining knife on the shelf and went out. It was pitch dark. A bracing air was blowing. The shrill shricks of the shunting engines resounded like ecstatic convulsions of a banshee".

"I walked through the lane stumbling with uncertain steps. I felt a delightful sense of privacy of an avenger in walking, at the dead of night, through the dark lane, vaulted by an array of shadowy buildings".

"At length, I confronted the gate and found it not locked. At my push the doors flung ajar. I walked along the verandah, then through a spacious hall and into a room. There was the man, the bane of my help. I nestled close to his bed with an irrevocable determination and from behind the door came the sad melody of the cool breeze rustling through the thick foliage of the trees".

"The sudden doubt that smote me slackened my resolve. A cloth was covering the body of the man. If he were some one else ? No, because Mohini slept in a bed close to his".

"I stood for a moment, considerably settled and then raised my hand with a resolute aim. But my hand trembled so visibly that I hastily lowered it. Would I let slip the opportunity ? On no account. A dreadful resolve gathered in my heart".

"An instant cry set the whole house astir. I was torn with terror. But before any body could arrive upon the scene, I flurried out of the house".

"When I returned back to my room I was fully horrified with my own act. I felt lacerating, overwhelmed with that bitter sense of the irrevocable. I realized that I could no longer, for my safety, remain at Mangalore. I left the city very night and came home nearly a fortnight ago".

So saying Gopee went to his room and brought a newspaper cutting. He was weeping profusely, with a shivering hand I received the piece. I understood from the news that the person whose life Gopee attempted was no other than the very doctor—Srinivas. He had received some injuries and was recovering in the hospital. It was also written that the absconded culprit was known to the doctor.

An intense agony coarsed through my body as I read this incredible news. I gazed at Gopee in a dazed manner. Gopee had stopped weeping, but he was a very picture of sorrow, looking at me in silent pang.

Before a week could elapse after this, Srinivas and a police came to Gopee's house. It was an early morning towards the end of the summer. The sky was sombre with patches of clouds heralding the coming monsoon. The law had its usual course, but it lead to Gopee's madness.

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ON SOME APPLICATIONS OF SPECTROSCOPY.

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INTRODUCTION

SPECTROSCOPY is the name given to that branch of physical sciences which starting modestly as 'Spectrum Analysis' dealing with the detection and analysis of elements has now grown to be very comprehensive being concerned with the study of electro-magnetic radiations, visible and non-visible, emitted or absorbed by matter. The range of electro-magnetic radiation is vast, extending from cosmic rays with wavelengths of only one trillionth of a centimetre, through gamma, X and ultra-violet rays to the visible spectrum which is but a very narrow band of rays of wavelengths roughly between four and seven times a hundred thousandth of a centimetre, and thence through infra-red, heat, radar and television rays to the short, long and very long radio waves of lengths over hundred million centimetres. The distinctive properties of these various waves determine the manifold variations in the methods of study, in the experimental instruments and in the techniques employed in different regions of spectroscopy. It is not the purpose of this article to deal with the entire range and scope of spectroscopy. We shall confine ourselves only to a few of the numerous outstanding achievements and applications of that small part of spectroscopy which has come to be known as 'optical spectroscopy' dealing with the infra-red, visible and ultra-violet radiations. These electro-magnetic waves can be separated into a spectrum by means of suitable prisms, optical gratings and interferometers. An instrument which by employing any of these components allows one to analyse and study the electro-magnetic radiations is called a spectroscope.

The accomplishments achieved by scientists through the use of the spectroscope form a list so imposing as to leave no doubt that this instrument is one of the most powerful now available for investigating the natural universe. More than twentyfive years ago it was the considered opinion of many of the renowned professors of science that the spectroscope is the most wonderful single scientific instrument and although at one time they assigned this premier position to the microscope, they had no doubt whatever that the spectroscope held that honour then. They would be even more

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convinced of the wisdom of this change of view at the present moment, for while microscopy is ever making great strides, spectroscopy is progressing by leaps and bounds. As instances which fire the imagination of the reader, the following lines describing but a few achievements of the spectroscope may be quoted: "With the same instrument one may at the laboratory bench analyse the residue from a single drop of London tap water, although that residue weighs but 1/50 of a milligram, determining with fair accuracy the proportions in which sodium, calcium, magnesium, and perhaps two or three other elements are present, and then, on directing it to the sky, discover the elements composing the material of the sun or of some remote star. The modern quartz spectrograph will reveal at once the major elements and every metallic impurity in a piece of steel, even to the extent of one part in a million; and should by the same technique search out in blood the trace of aluminium absorbed by a single meal of some food containing only a customary amount of alum baking powder. The light given out by a candle may be compared with that emitted by an electric arc, both in quality and in quantity, more satisfactorily than by any other means. When the spectrograph is put into adjustment with a suitable photometer, it will ascertain not only that the drug separated from some toxicological material is morphine, but also determine that the quantity separated is the 1/100 part of a milligram. The method depends on the manner in which the morphine absorbs light, and by the same principles, governing the "absorption spectrum", one studies the lines in the solar spectrum and finds that the incandescent envelope of the sun contains the same metals as those forming the crust of the earth, but in the form of vapour. And so one might continue reciting these marvels to the filling of the book. It must suffice at this stage to add only one other practical triumph, namely, that the measurements of the wavelengths of light constitute the most precise known to science. By reference to the spectrum one may measure the smallest distances such as the one millionth of a centimetre, and determine the length of a yard stick more precisely than is possible by comparing it with the standards at Greenwich or Paris. The spectroscopic metre has already been adopted in some half-dozen countries".[1]

Part A—Physical Sciences.

(*a*) *Physics.*

The late Professor Kayser in a statistical study, has given a remarkably complete collection of publications of spectroscopic researches from all countries from 1800 to 1930 A.D. The average number of spectroscopic

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researches published per year rose from 25 in 1855 to 100 in 1865, to 200 in 1875 and reached 400 i.e., a little more than one research paper a day in 1905. This is the earlier period of spectroscopy where the interest was largely concerned with the chemical and physical properties of matter as revealed by the spectroscope. In the second period from 1920 to 1930 it was the power of the spectroscope in revealing the secrets of atomic and molecular structure that stimulated interest in its use. The number of research papers published on atomic spectra alone not counting those of the type of the first period and those on Astro-physics, rose from 200 in 1920 to 650 or roughly two papers a day in 1928. If one takes up such a statistical study for the third and most brilliant period of spectroscopy from 1930 to date, the figures will be simply enormous. Sawyer summarises the achievements of spectroscopy in the domain of our knowledge regarding the atom in the following words: "New discoveries in the use of spectroscopic data in the interpretation of the properties of atoms and molecules kept this interest active well into the twentieth century. The whole period from 1860 almost to the present has been rich in such fundamental discoveries, each opening new fields of spectroscopic research and leading to the enlargement and refinement of our understanding of the atom and of its mathematical theory. It is impossible to discuss all of these steps; some of them however should be mentioned. Among the outstanding pieces of work of the last half century are Zeeman's discovery of the magnetic splitting of spectral lines (1896); the studies of fluorescence begun by Stokes and leading to Wood's discovery and study in the early years of the century of the resonance radiation of vapours; the Bohr theory of the hydrogen atom (1913) which initiated a period of tremendous development of atomic theory, with its extension by Sommerfeld and others, culminating in quantum mechanics and the wave theory of the atom of Schroedinger and DeBroglie (1925-26); the first analysis of the complex spectra of atoms in the higher columns of the periodic table by Catalan in 1921; and the spectroscopic determination of nuclear spin by Goudsmit and Back (1926). Many others could be cited, all of which contributed to the field of spectrographic research".[2] Almost similar striking remarks may be made regarding the work of the spectroscope in unravelling the structure of molecules in the years following 1928 till today. This period may be characterised with considerable justification as the molecular and nuclear era in physics. The fundamental discoveries which spectroscopy enabled the physicist to make in this period have been of far reaching importance in more than one direction. Studies in molecular spectra for example were responsible for a great deal of the development of quantum theory

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into wave-mechanics. The existence of zero-point energy, the unique determination of the spin, the magnetic moment and the relevant statistics of different nuclei are some of the outstanding contributions added to which the discovery by C. V. Raman of the remarkable phenomenon in light scattering stands as a distinct land mark in the history of molecular physics. If figures count it may be mentioned as fact that during the ten years following the discovery of Raman Effect in 1928 more than 50 books and review articles and 1500 research papers were published. Similarly, the number of important research papers on diatomic molecular spectra alone during the last twenty years has been near about 2000. So far as its application to physics is concerned spectroscopy is at present actively interested in the structure of polyatomic molecules, the nature of the liquid and solid states of matter, nuclear physics, collision processes, determination of high temperature and the calculation of thermodynamic quantities.

(*b*) *Astronomy and Astrophysics.*

If however, the study of spectra has yielded information of fundamental importance to Physics, it has quite revolutionised Astronomy; so much so that the first quarter of the present century has seen the birth of a new science—Astrophysics. Johnson has to say the following in this connection: "By an analysis of the light coming from distant stars and nebulae, from the sun and the planets it has made possible not only a celestial chemistry but a celestial physics, in providing us with knowledge of the behaviour of matter at temperatures and pressures differing vastly from any that occur on the earth. But by a study in the laboratory of the variations in spectra under various physical conditions we have an index to the extreme conditions prevailing in celestial bodies. In connection with the solar spectrum for example, there are some 16,000 lines, two thousand of which belong to iron. Altogether some 66 terrestrial elements have been detected in the solar spectrum.....The spectroscopic study of sunspots has revealed the true nature of these as vortices in which matter is in rapid circulation, and it has been found that there are strong magnetic fields connected with them....We also know through the spectroscope that the sun rotates not as a rigid body but more rapidly at the equator than at the poles. Planetary spectra again provide an interesting sequence, and these confirm the views as to planetary temperatures which had been formed on quite other grounds....."[3] The bearing of spectroscopic evidence on the course of evolution of a star became really significant since the time when in 1920, M. N. Saha gave the correct interpretation of stellar

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spectra. Jeans has to say the following in this connection :—"At different temperatures, the different chemical elements of a star show up in strength. Thus at a temperature of say 10,000°, the atoms of some substances, but not all, will be actively engaged in emitting radiation; if the temperature falls to half, these substances will leave off emitting radiation, while others will take their place. On the old interpretation of stellar spectra, a star which was suddenly cooled from 10,000° to 5,000° would have seemed suddenly to change the hydrogen, helium and iron of which it was made into calcium, carbon, etc. We know now that all stars are formed out of much the same mixture of elements, but show different spectra because their surface layers are at different temperatures. In this way the spectrum is useful as an indication of temperature. But this is far from being its only use; it also yields information as to the motion of a star in space, the intrinsic brightness of a star, its mass and the composition of its atmosphere".[4] In more recent years molecular spectra have been of increasing importance in the investigations of astrophysical problems. Particularly interesting are the data on the absorption and emission spectra of the earth's atmosphere, the planetary atmosphere and the stellar atmosphere. The spectroscopic data on the absorption lines in interstellar space have a significant bearing on the formation and dissociation of interstellar molecules.

(c) *Chemistry.*

As it very often has happened in the history of physical instruments, it was the chemist who first foresaw the importance of the spectroscope from its very birth, as a powerful tool for qualitative analysis and in later years for quantitative analysis. The result was the discovery of many elements among them cesium and rubidium by Bunsen and Kirchhoff and later helium, gallium, indium and thallium by various other chemists. In recent years the discovery of the rare isotopes of the common elements hydrogen, carbon, nitrogen and oxygen has been a notable achievement with profound influence on the physics of the nucleus. Again, spectroscopic analysis was such a powerful aid in the separation of the various rare-earth elements that the discovery of many of these may properly be credited to the spectroscope. If this fact is borne in mind one can recognise the necessity and significance of spectroscopic research in elements which are of importance to atomic energy because these elements form the second rare-earth series, knowledge about which is well shielded on military considerations. Not only has the spectroscope become a foremost instrument in all branches of chemistry because of its analytical power, it has also

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enabled chemists to understand from their spectra the structure of many molecules including some of great complexity. The structure of such molecules as penicilin and vitamin K for example, were worked out with extensive help from the spectroscope. The chemistry of aromatic compounds has been given a powerful impetus by the recent knowledge that spectroscopy has revealed on the structure of benzene and related molecules.

The results of band spectroscopy are of importance to the problem of valence or quite generally the problem of chemical attraction. The existence of free radicals in chemical reactions was first unambiguously demonstrated by investigations of band spectra, In addition, the vibration frequencies, internuclear distances, heats of dissociation and electronic structure of many free radicals such as, CH, C_2, CN, NH, OH etc., have also been determined. The determination of the concentration of OH radicals in discharges through H_2O and H_2O_2 under certain well-defined conditions allows one to draw conclusions about the mechanism of the disappearance of these radicals. As opposed to the free radicals, the existence of stable diatomic molecules in the vapours of the alkali and certain other metals previously regarded as monoatomic has been proved spectroscopically.

Since both the velocity of a reaction and the extent to which it takes place are dependent on the forces between atoms i.e. the chemical bond energies, the knowledge of the properties of free radicals in chemical reactions of gases is of great aid in the understanding of individual steps of a given reaction and in particular of the chemiluminescence, if any, accompanying the reaction. Spectroscopic data thus allow one to make highly precise calculations of the velocity and equilibrium constants of chemical reactions in gases and have been successfully applied to numerous combustion processes and chemical reactions, explaining the conditions that govern phenomena such as chain reaction, chain branching, explosion, chemiluminescence etc. For example, the equilibrium of the reaction of hydrogen and chlorine to form hydrogen-chloride gas at any temperature up to 5000°C has been calculated entirely from spectroscopic data.[5] Another branch of chemistry which makes entensive use of spectroscopy is the highly complex and fruitful field of photo-chemistry with its obvious applications to problems of food production and agriculture.

(*d*) *Theoretical Physics and Cosmology.*

Remarkable as these centributions of spectroscopy are to the growth of physical sciences, its service to Natural Philosophy and to the develop-

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ment of human thought in the abstract can never be over-estimated. It is a matter of history, how against the back-ground of the earlier laws of Newton and Galileo "succeeding generations of physicists gardually added to the sum total of human knowledge until in the first quarter of this century, two great theoretical systems were developed. One the quantum Theory which has shaped all our concepts of the atom and molecule, the basic units of matter and energy and the realities that are too small to be perceived".[6] If it is now recalled that such achievement of the quantum theory was in the main due to the most accurate evidence about atoms and molecules that is furnished by spectroscopy as detailed earlier, so that one can say with justification that the spectroscope has been the very life essence (*Prana*) of quantum theory, one can form an idea of its contribution to fundamental human knowledge. Not less important or striking are the services rendered by spectroscopy to the other great theoretical system of the present century, probably the greatest of all ages, Enistein's Theory of Relativity, "which has shaped all our concepts of space, time and gravitation and the realities that are too remote and too vast to be percieved".[6] Spectroscopy has afforded the most convincing evidence in support of the fundamental concepts of the theory of relativity, viz., (1) the relativistic retardation of time intervals, (2) the variation of time intervals with gravitational fields, (3) the conception of the Universe as space-time continuum and (4) new concepts in cosmology. Barnett summarises those contributions of spectroscopy in the following paragraphs :—

(1) "Remarkable proof of the relativistic retardation of time intervals came out of an experiment performed by H. E. Ives of the Bell Telephone Laboratories in 1936. A radiating atom may be regarded as a kind of clock in that it emits light of a definite frequency and wavelength which can be measured with great precision by means of a spectroscope. Ives compared the light emitted by hydrogen atoms moving at high velocities with that emitted by hydrogen atoms at rest, and found that the frequency of vibration of the moving atoms was reduced in exact accordance with the predictions of Einstein's equations".[6]

(2) "Another prediction made by Einstein on the basis of General Relativity pertained to time. Having shown how the properties of space are affected by a gravitational field, Einstein reached the conclusion by analogous but somewhat more involved reasoning that time intervals also vary with the gravitational field. A clock transported to the sun should run at a slightly slower rhythm than on earth. And a radiating solar atom should emit light of slightly lower frequency than an atom of the

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same element on earth. The difference in wavelength would in this case be immeasurably small. But there are in the universe gravitation fields stronger than the sun's. One of these surrounds the freak star known as the "companion of Sirius"—a white dwarf composed of matter in a state of such fantastic density that one cubic inch of it would weigh a ton on earth. Because of its great mass, this extraordinary dwarf, which is only three times larger than the earth, has a gravitational field potent enough to perturb the movements of Sirius, seventy times its size. Its field is also powerful enough to slow down the frequency of its own radiation by a measurable degree, and spectroscopic observations have indeed proved that the frequency of light emitted by Sirius' companion is reduced by the exact amount predicted by Einstein. The shift of wavelength in the spectrum of this star is known to astronomers as "the Einstein Effect" and constitutes an additional verification of General Relativity".[6]

(3) "Obviously the astronomer has to think of the universe as a space-time continuum. When he peers through his telescope he looks not only outward in space, but backward in time. His sensitive cameras can detect the glimmer of island universes 500 million light years away—faint gleams that began their journey at a period of terrestrial time when the first vertebrates were starting to crawl from warm Paleozoic seas on to the young continents of Earth. His spectroscope tells him, moreover, that these huge outer systems are hurtling into limbo, away from our own galaxy, at incredible velocities ranging up to 35,000 miles a second. Or, more precisely, they *were* preceding from us 500 million years ago. Where they are "now", or whether they even exist "now", no one can say. If we break down our picture of the universe into three subjective dimensions of space and one of local time, then these galaxies have no objective existence save as faint smudges of ancient enfeebled light on a photographic plate. They attain physical reality only in their proper frame of reference, which is the four-dimensional space-time continumm".[6]

(4) "This extraordinary phenomenon (organized flight of the distant galaxies) greatly complicates cosmology. If the spectroscopic analysis that indicates the recession of these outer galaxies is correct (as most astronomers belive it to be) then velocities with which they are vanishing into limbo are almost beyond belief. Their speed appears to increase with distance. While the nearer galaxies about one million light years away, are travelling at a mere 100 miles a second, those 250 million light years away, are flying off at a fantastic rate of 25,000 miles a second, almost one-seventh the velocity of light. Since all of these remote galaxies, without

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exception, are moving *away* from us and from each other one must conclude that at some epoch of cosmic time, all of them were clustered together in one fiery inchoate mass. And if the geometry of space is shaped by its material content, then the universe in this pre-galactic phase must have been an uncomfortably cramped and crowded receptacle, characterized by an excessive curvature and packed with matter in a state of inconceivable density. Calculations based on the velocities of the receding galaxies show that they must have separated and started their flight from the "centre" of this shruken universe about two billion years ago".[6]

If one reflects upon the fact that our entire knowledge of the universe is based on these two theories, 'two of the most magnificient achievements in which the human mind may take pride,'[7] viz., the quantum theory and the theory of relativity, one can properly assess the significance of the spectroscope to the scientist.

PART B—BIOLOGICAL & GEOLOGICAL SCIENCES AND TECHNOLOGY.

(*a*) *Introduction.*

On the industrial and scientific applications of spectroscopy in certain of its aspects, Judd Lewis observes: "There are few branches of either science or industry founded on the properties of materials which are not illumined some measure by the application of spectroscopic analysis. Metals and engineering, minerals and mining, chemicals and chemical manufacture, vegetable tissues and every type of product therefrom; animal substances and physiology; bacteriology and bio-chemistry; pharmacy, medicine; gases. All these are explorable by emission spectroscopy .....". Considering the applications of absorption spectroscopy he says; "One finds that the field of industrial application includes the dyes; rare earths; vitamins, alkaloids and other principles associated with toxicology; blood sera, proteins, amino-acids, bile pigments, & etc.; glasses of every type, films and other transparencies; oils; mineral oils; the detection of aromatic hydrocarbons in petrol, &c.; vegetable and animal pigments; and much else besides. All or most of these observations are expressions of the chemical constitution of the substance investigated, and it was in the quest of light on the structure of organic compounds that the science and technique received their greatest development".[1]

In its applications to biological and geological sciences and problems of technology and industry, it is the high analytical power of the spectroscopic method that is mostly utilised and this power is not unlimited. While

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it is not our purpose to enter into disucssion of these limitations of spectroscopic methods we should like to quote the following from Ballard: "It should be noted that extravagent (or perhaps, more correctly, over-enthusiastic) claims have been made for the spectrograph as an analytical tool by some spectroscopists and by manufacturers of spectroscopic equipment. It must be stated that the spectrograph is not the panacea for all analytical ills. In the opinion of the writer the spectrograph is a very powerful analytical tool, but is most effective when used not individually, but rather in conjunction with the standard bench methods. Some types of analysis can be carried out more easily and accurately by chemical methods, others by the spectrograph. Therefore it is desirable that the analyst should appreciate the particular advantage of these two technics".[8] Spectroscopists agree entirely with Ballard! It should, however, be realised that these limitations do not in any way affect the brilliant achievements to the credit of spectroscopy in these fields, some of which we shall presently discuss nor do they undermine the unique value of its remarkable contributions in experimental and theoretical branches of physical sciences already described above.

(*b*) *Biology, Biochemistry and Medicine.*

The possible lines of application of spectroscopic methods to various problems of biological, geological and applied sciences have been adequately discussed by several workers in the respective fields. In the case of biological sciences these have been reviewed by Loofbourow in a comprehensive review on 'Borderland Problems in Biology and Physics', in which an account of the present state of the subject is outlined. On the applications of infra-red and Raman spectroscopy he says, "The value of these methods lies, at present, particularly in the investigation of special problems, such as those of association and hydrogen bonding, rather than in their use as a routine means of identifying unknown compounds or of investigating unknown structures, although the latter applications are frequently suggested in the literature..... When the physicist becomes better acquainted with biological and biochemical problems and the biological worker learns more of the terminology and techniques of the physicist, one may expect rapid progress in such investigations".[9]

The more invoked spectroscopic method is that of the visible and ultraviolet, absorption, fluorescence and emission spectra regarding which we learn the following: "absorption spectroscopy has proved of great value in biological investigations, especially in: (*a*) the empirical identi-

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fication of compounds available in quantities too minute to be examined by usual analytical methods; (*b*) the quantitative estimation of compounds with well-defined characteristic absorption; (*c*) the solution of structural problems by comparison of the absorption of an unknown substance with that of substances of known structure to which the unknown is suspected of being related; and (*d*) the study of biochemical reactions involving substances with characteristic absorption (e.g., in the living cell—biokinetics). ..... Absorption spectrophotometry has played an important role in elucidating the structure of respiratory enzymes and in following their activities in the living cell (biokinetics). The respiratory enzyme complex called 'cytochrome' which, through its ability to be reversibly oxidised and reduced, acts as a hydrogen carrier in the oxidative processes taking place in the living cell, has a characteristic absorption spectrum in the reduced form consisting of a series of bands in the visible region of the spectrum. On oxdiation the bands near 6000A fade. These spectrographic changes can be observed in living cells and used to follow oxidative changes within the cell under various conditions.....In insects (e.g., wax moths) bands indicating reduced cytochrome appear after vigourous exertion, but these disappear, indicating oxidation of the cytochrome, if the insect remains quiet"[9].

Among the most dramatic results which have come from applications of fluorescence spectroscopy to problems in biochemistry is the "identification ..... of the active agent in cancer-producing tars as a poly cyclic hydrocarbon on the basis of similarities in the fluorescent spectra of cancer-producing tar fractions and that of 1-2 benzanthracene. This and later work lies at the basis of the present knowledge of carcinogenic hydrocarbons with the phenanthrenecyclopentane nucleus, as well as related carcinogens. Developments from these investigations have not only pointed the way to the control of the cancer hazard among coal-tar workers and chimney sweeps but have also provided the cancer investigator with a means of producing malignant timours routinely in laboratory animals".[9]

The principal application of emission spectra has been in the detection of metals in tissues, for example in studying the accumulation of lead and other metals in persons subjected to them. Considerable work has been done by Gerlach and Gerlach on the clinical and pathological applications of spectroscopy. They have evolved convenient methods and standardised them for the qualitative and quantitative analysis of organs, secreta and execreta and have applied them with considerable success to several histochemical problems and to cases of electropathology, pneumoconiosis and

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shot wounds.[10] The determination of the metallic nutritional requirements of yeast, the analysis of biological fluids for heavy metals and investigation of magnesium content of blood in various diseases are other subjects studied by emission spectroscopy.

The rôle of spectroscopy in medicine is thus rapidly increasing in recent years. It will be seen from the above that some of its more important applications have been to the investigation of (1) toxicological problems such as the metabolism of the heavy metals and their significance for pathological conditions of the organism; (2) pigmented body fluids and of physiologically and clinically important pigments; and (3) of vitamins, hormones and co-enzymes. Mention has been already made of the important part that spectroscopy has played in elucidating the complex interactions of different kinds of bio-catalysts. Lastly we close this account by the following quotation from Harrison, Lord and Loofbourow:

"Micro-absorption spectrophotometry in the ultraviolet is finding increasing application in the study of the distribution of substances like nucleic acids in cells and tissues in relation to fundamental biologiczl and medical problems, such as those of cell division, growth differentiation, normal physiology and pathology. The use of this technique in the visible region (in connection with specific color reactions) and in the infra-red promises to lead to the solution of many hitherto abstruse biological and medical problems. Micro-fluorescence spectroscopy, though not yet used on a wide scale, has similar applications."[5]

Similarly, spectroscopic methods are employed in testing for poisons and controlling the production of foods and their containers because the importance of minute quantities of substances that may be beneficial or injurious to life is now well realised. They are also widely used in the assay of foods for their vitamin content.

(c) *Botany and Agriculture.*

Equally significant have been the applications of spectroscopy to problems in botany and agriculture. Take for instance, the problem of the rôle of trace elements in plant life. The water culture method of growing plants under strictly controllable conditions has revealed that in addition to the usual Knop and Sachs list of elements viz., carbon, hydrogen, oxygen, nitrogen, sulphur, phosphorous, potassium, calcium, magnesium and iron which are necessary to ensure the healthy development of a plant throughout its life history, the presence of minute quantities of many other elements is essential. For example, the best established list of elements essential

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for higher plants contains manganese, boron, zinc and copper; and for the growth of plants of some species, chlorine, aluminium, silicon, molybdenum and gallium may be necessary. Similarly for the growth of certain algal and fungal species, boron, columbium, tungsten, molybdenum and gallium are found to be necessary. Because little more than traces of these elements are necessary, they are referred to collectively as trace elements or micro-nutrients. If they are present in amounts more than a few parts per million of the culture solution, they generally have a quite definite poisonous effect. The problem is therefore one which affects both plant physiology and plant pathology. Concluding his short article on trace elements in plants, W. Stiles says; "It should be clear, then, that the trace elements, although required by plants in such small quantity, are nevertheless of the greatest importance, both from the economic and purely scientific points of view. That this is now recognised by biologists, is shown by the increasing number of workers, in Britain, Asutralia and America, engaged in investigating the problems they present to the plant physiologist, plant pathologist, agriculturist and horticulturist. We are indeed at the beginning of a new phase in the investigation of these problems. So far the work done has been largely qualitative, but, as in most sciences, qualitative observation can only take a relatively short way towards solving the problems presented to us. With methods now available for the quantitative determination of the trace elements, we may hope to see in the near future the development of researches on a quantitative basis and a consequent enlargement of our knowledge and understanding of the part played by the trace elements in the life of plants".[11]

Spectroscopic analysis of soils, plants and related materials is an active and overgrowing branch in modern agricultural research. Another interesting fact of considerable importance in biology and agriculture discovered by spectroscopy is that the absorption spectrum of hæmatoporphyrin obtained from hæmaglobin of the blood is very similar to that of phylloporphyrin obtained from chlorophyll. "This is interesting especially as the two colour principles are so intimately associated with gaseous exchange in animal and vegetable life respectively, and the more so when it is borne in mind that photo-synthesis in the leaf is influenced greatly by the wavelength of the incident light".[1]

(*d*) *Geology.*

Spectroscopy has frequently been called upon to solve minerological and geological problems especially for the purpose of determining minute

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quantities of metallic elements in rocks and ores and of arriving at a knowledge of the distribution of important elements in a given ore deposit or geological formation, in short for the whole science of mineral deposits—geochemistry and geophysics. As an interesting application may be mentioned the spectroscopic determination of the atomic weight of radio-lead which enables the determination of the age of the mineral and of the earth.

(e) *Metallurgy.*

Among the diverse fields in which spectroscopy has worked, it is in its application to metallurgy that one finds the most realiable results in quantitative spectroscopy. As a matter of fact, progress in quantitative work has been favoured by experience in metallurgical spectroscopy where success has been greatly strengthened by the alloys under examination being more or less homogeneous. Spectroscopic methods have been in use in the ferrous as well as non-ferrous metallurgical industry for many years now in all parts of the world. In England D. M. Smith for the British Non-ferrous Metals Research Association has been working for the last 25 years in standardizing routine methods for the quantitative determination of impurities in zinc, copper, tin, lead, aluminium, nickel and platinum. Already in 1939 a single laboratory attached to one of the most important metallurgical concerns in Belgium used to make about 11,500 determinations each month, involving the examination of 2000-3000 samples. As long ago as 1914, the Amercian Brass and Bronze Company commenced regularly to use spectrum analysis in testing the purity of their raw materials and for other purposes of that nature. Today in Amercia there are all types of spectrographs designed to meet the ever-growing needs of industry for specific analysis. The following head lines and news item from the Wall Street Journal, New York, November 26,1947, is typical of what is going on in this line in that country;

"NEW 'Steel-Taster' speeds Molten Metal sampling at the Mill".

"Electronic instrument measures alloys in mixture; records 'poison' elements, too".

"A new electronic instrument enables steel makers to sample a batch of molten metal, to see if it is ready for pouring, with the facility of a cook tasting chowder.

This 'steel-tasting' machine, more formally known as the Baird Associates—Dow Direct Reading Spectrometer, cuts from 20 minutes or more to 5 minutes or less the time needed to make an analysis of the elements in a particular batch of steel. It can be applied to aluminium and other metals too".

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Indeed, the growing complexity of industrial alloys; the increasing appreciation of the importance of small quantities of impurities; the necessity for rapid decision in buying ores, spelters etc.; the ease of spectroscopic analysis in certain instances where chemical analysis is almost impossible,—all these factors have combined to make the adoption of spectroscopic methods as routine methods for metallurgical purposes, very rapid indeed in the last few years. There are now available more or less standardized methods for the analysis of aluminium and aluminium alloys, lead and lead alloys, aluminium, copper and magnesium in zinc alloys; aluminium in aluminium brass; beryllium and cobalt in copper alloys; and of platinum for detection of impurities of any metal whatsoever, the sensitivity of detection being less than 0.0001% for copper and silver and upto about 0.03% for iridium. The analysis of steels has been so well standardized that for rapid routine in factories a convenient visual spectroscope called the 'Steeloscope' has been in the market for considerable years now. The instrument above advertised in the Wall Street Journal "separates the characteristic spectrum line of as many as eight elements. Light sensitive tubes measure the strength of each spectrum line to determine the relative amounts of elements making up the batch. The results are measurable on meters. Recording may be done of the exact amounts present of manganese, silicon, chromium, nickel, molybdenum, copper, vanadium, aluminium or other metals employed by the manufacturer. The instrument also will record the presence of residual elements which can "poison" the metal batch".

From amongst innumerable instances we shall but mention two interesting cases of the application of spectroscopic methods in industry. Both of them are quoted by Judd Lewis in the course of his experience as a consulting spectroscopist and analytical chemist. The first concerns the origin of a very slight, almost imperceptible odour in a high grade medicinal paraffin, which would result in the depreciation of the value of the oil and consequent economic loss to the company dealing in the oil. As the oil had been transported from abroad in galvanized iron drums, a minute trace of zinc might, it was thought, be enlightening. Spectroscopic search showed it to be present to the extent of 1 part in 4,00,00,000. This was not surprising; but it was accompanied by about one-third that quantity of cadmium, 1 in 130,000,000 and a little lead. So large a relative quantity of cadmium and more than a normal proportion of lead were suggestive of very bad galvanizing. "On breaking open some of the drums the galvanizing was indeed found to be extraordinarily bad; even otherwise the inside of the drum was not satisfactory. Such minute quantities of metal

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in the oil would never have been identified other than spectroscopically. Actually the metals were not the real cause of the odour, but the resinous flux employed in making the drums. The depreciation in value of some 300 or 400 drums of oil was thus recovered".

There was a dispute between two chemical experts in connection with the copper content in silver from one of the larger silverfirms. The spectroscopist was asked to discriminate between the results of the expert chemists and to decide whether the copper in the highly refined silver was 0.003 or 0.007 per cent. The spectroscopic figure was only 0.00028 per cent, one-tenth part of the lower figure. "After careful checking the matter was referred back, when it was found that a cypher had been omitted from each of the reported figurts".[12]

(*f*) *Glass.*

Glass has been very well served by spectroscopic analysis. There is perhaps no type of glass which has not been the subject of enquiry. Imperfection in the uniformity of transmission of optical glass leads to disturbance in the performance of lenses and prisms and other optical parts of an instrument for which the glass is used. Spectroscopy has helped to produce glasses for the tropics which will allow as little heat to pass as possible; window glass which will allow the desired ultraviolet radiation to pass through; Wood's glass which absorbs all the visible light and transmits a small band in the ultraviolet so that it is useful for apparatus designed for examining materials for their fluorescent properties; and spectacle glass which has to cut off the undesired portion of the violet and the entire ultraviolet portions of the spectrum.

(*g*) *Criminology, Archæology and Art History.*

Lastly we give some miscellaneous applications of spectroscopy. These concern the use of spectroscopy in criminal investigations, in archæology and to students of Art History. The following quotation gives the nature of the problems that a police laboratory may be called upon to solve in a modern state: "In the course of a typical day one may receive a half dozen quart jars filled with human organs to be analysed for small traces of poison, from another case a chisel having on its surface an almost invisible amount of a foreign metal, while again one may receive a pair of old trousers with traces of dust on the knees, or paint from a car involved in a hit-and-run accident, or blood stains on a knife, or a pellet of shot removed from a body, or ashes and debris from an incendiary fire, or broken

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pieces of a burglar's tool, or residues from the scene of an explosion. Unusual and varied subject matter requires versatile methods and instruments. In many of these cases spectrographic analysis can be advantageously applied and in a few it is essential". The origin of the purple colour of the gold sequins found on mummies in Egyptian tombs was traced for the archæologists by a spectroscopist, to certain impurities present naturally in some samples of gold. An identification of these impurities enabled him to locate the place where the gold had been mined and to duplicate the purple colour. To the question whether the ancient Egyptians employed bitumen for embalming, a satisfactory answer was given by spectroscopic analysis. Judd Lewis writes: "It was found that Judaen bitumen contains regularly small quantities of vanadium, nickel and molybdenum, while other embalming mixtures composed of resin, wood tar or the like, contain little or none of these elements. "It seems clear from the materials available for examination, that bitumen was used for embalming, mixed with resin and tar.....This investigation indicates the value of spectroscopic analysis in dealing with unknown substances.....Within the realm of Egyptology, as well as outside it, subtle problems may be solved with little difficulty. "Thus light is thrown on the march of ancient history". Finally, exact knowledge of materials used by ancient and medieval craftsmen is of great importance to students of Art History. Investigations on such problems can be profitably carried out by the spectroscopist, "who by determining the nature of materials used at specific times and places gathers valuable data regarding the evolution of "workshop practice" in the past, and helps to trace the growth of that subtle insight into the nature of various substances which enabled workers of bygone times to perfect the material basis of masterpieces which are for all time monuments of combined technical skill and artistic inspitation".[1]

Concluding remarks.

In the preceding pages an attempt has been made to present in a non-technical manner, a short sketch of some of the outstanding contributions of optical spectroscopy towards the rapid development and progress which has been witnessed during the last fifty years in science and technology. Sufficient has been said to bring home the truth of the statement that "both in applied and in pure sciences, there is probably no instrument comparable to the spectroscope in the variety of its use and in the fundamental contributions it has rendered to them. It has brought many diverse branches of Natural Sciences closer together". These achievements which are remarkable as much for quality as for volume, embracing as they do almost

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every phase of life from the purely intellectual to the physically material, have been possible because of the one characteristic property of all spectroscopic research namely that, spectroscopic observations are usually as easily reproducable as they are accurate. It is this feature that brings to the spectroscopist a feeling of confidence in his work much earlier than any other branch of scientific investigation, strengthens his faith day after day and leads him on to an increasingly greater appreciation of the fundamental reality in the universe.

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A woman went into a photographer's shop, produced a picture of her departed husband and said, "I want this enlarged".

The photographer asked, "Would you like to have it mounted?"

The young lady replied eagerly, "He would look nice on a horse".

The policeman raised his hand ; the woman motorist stopped with a jerk. "As soon as I saw you, miss", the policeman said, "I said to myself, 'Forty-five, at least'."

"Oh, no!" said the woman, "It's this hat that makes me look so old".

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IMITATION GOLD

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Since very early times Gold has attracted the attention of man. From the dawn of civilization, the recovery of nuggets from placer concentrates has been as widespread as any art. The metal by reason of its occurrence, natural colour and brilliance is probably the first known metal to man. It is on account of its excellent properties like ductility, malleability, resistance to atmospheric attack that the metal occupies a unique position amongst metals and is rightly called a "Noble metal".

This precious metal has ever been the cause of ever so many changes in history as the wealth of a nation has been judged by the amount of gold she possessed and so, man has ever been trying to procure the metal. The "Atomic scientist" today may well ridicule the "Alchemist" who inspired by the idea of "philosopher's stone", made a futile attempt to convert base elements into gold by mere touch. But, his dreams though not fully realised, have been partially fulfilled in the present era when the tremendous rise in the prices of gold made it out of reach to the common man, but the persistent demand for gold like things compelled the metallurgist to make alloys having properties similar to gold. This led to the discovery of "Imitation Gold". Durable and decorative things having the properties of gold have been manufactured out of these alloys.

Imitation gold has come into the market under various names, the particulars of a few being given below :—Essentially all of them are copper base alloys with additions of zinc, aluminium, tin, antimony, iron, lead etc. in various proportions to yield most of the properties of gold.

Tombac.

This is an alloy of copper with zinc ranging upto 18% and has a reddish golden yellow colour, instead of the yellow brass colour. Articles of such an alloy were brought from Siam in the 17th Century, and the Malayan name Tambga (actual copper) was converted into Tombac.

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Pure Tombac, i.e., the alloy free from lead, tin and other impurities which impair flexibility, is distinguished by a comparatively high degree of ductility at the ordinary temperature, but it cannot be worked at elevated temperatures. The chief use of the alloy is in the manufacture of fictitious gold articles possessing a gold-like colour and manufactured by "striking" in a die under a press or drop hammer. To this class belong cheap jewellery and ornaments, buttons and Dutch gold leaf. The varieties of Tombac which contain not less than 10% and not over 18% zinc possess a colour most closely resembling that of gold. Articles made of such alloys are generally thinly gilded as otherwise, they soon get tarnished and require frequent cleaning.

The following table gives some of the typical alloys of the Tombac group :—

		Percentage of		
		Cu	Zn	Pb
1.	Tombac German (Oker)	85	15	—
2.	„ „ (Hegermuhl)	85.3	14.7	—
3.	„ „ (Luden Cheed)	82.3	17.7	—

Manheim Gold

This is an alloy of copper with zinc and tin, and has a beautiful golden colour. Its composition varies considerably as given below :—

	I	II
Copper	83.7	89.8
Zinc	9.3	9.6
Tin	7.0	0.6

Manheim gold was formerly much used in the manufacture of buttons and pressed articles of gold-like appearance, but it has recently been superseded by other alloys which are far superior in colour.

Talmi or Talmi Gold.

This type of imitation gold was brought into the market from Paris and cheap articles of jewellery, chains, ear-rings, bracelets, etc. were manufactured of Talmi gold and were distinguished by fine workmanship, low price, golden colour and great durability.

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A certain variety of Talmi Gold retains its copper gold colour for some time. The alloy consists of brass or copper or Tombac as the base metal and over this is clad a thin strip of gold. These gold clad strips, prior to their use, are rolled so that both the gold cover and the base metal are held tightly and firmly. Incidentally the rolling imparts considerable density to the gold. Articles made in this way have been found to retain their gold-like appearance for years.

At present, articles of Talmi gold are brought into the market which are simply electro-plated, the coating of gold being in many cases so thin that by strong rubbing with a rough cloth, the colour of the base is easily exposed. Such articles ofcourse lose their gold appearance in a short time.

In the following table are given the composition of a few alloys which are used in the manufacture of Talmi gold.

	I	II	III	IV	V	VI
Copper	89.9	90.8	90.0	90.7	87.5	93.4
Zinc	9.1	8.3	—	8.9	12.4	6.5
Gold	1.03	0.9	0.91	0.05	0.05	0.05

The compositions of various alloys show that the content of gold varies very much. The durability of the articles manufactured from the respective alloys being of course a corresponding one. The alloys I, II and III are genuine Paris Talmi gold, while IV, V and VI are imitations which are of the electroplated variety. There is another alloy of composition, Copper 86.4, Zinc 12.2, tin 1.1 and iron 0.3, which is frequently used but being of a faulty composition the gold does not adhere.

Gold Like Alloy

This is an alloy of copper and antimony, the composition being 96% copper and 4% antimony. This is a French alloy and resembles very closely gold in all respects, specially as regards colour. The alloy however, lacks ductility and malleability, and thus different shapes can be obtained only by casting in suitable moulds. The alloy can be advantageously used for the manufacture of ornaments and other articles of decoration.

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Aluminium Bronze.

The alloys of copper and aluminium are known as Aluminium Bronzes and have since been substituted for gold because of their appearance and other similar properties. With the addition of aluminium to copper the latter quickly loses its characteristic colour which is gradually diluted and disappears at about 3.5% of aluminium. From 3.5 to 8% there is a continuous change from deep to pale gold. After this percentage is passed, there is a gradual darkening of the pale gold through various reddish colour bronzes. Hence, the most widely used alloy has the composition as 92% copper and 8% aluminium.

Besides its pleasing gold colour the alloy is very malleable, ductile and resistant to all normal forms of corrosion. It may seem anomalous that because an oxide film (a very thin but continuous film of alumina is formed as the aluminium oxidises very readily) is formed so readily, the aluminium bronzes are highly resistant to oxidation and scaling and this is in fact true, because the film itself provides protection against further oxidation.

As the alloy is highly favourable and does not tarnish on exposure to atmosphere, it finds a wide use in the manufacture of cheap jewellery and decorative articles used in every day life, like medals, plaques, trays, cigarette cases, powder compacts, sheets etc.

The various types of imitation gold may, however, be used to make ornaments of upto date design. The use of gold for ornamental purposes in our country is quite considerable. Though the people covet this metal very much, yet its high price is a stumbling block to its wider use by all sections of the people. Hence, the advent of Imitation Gold is a welcome boon to the general public as its price is such that it can suit the purse of the common man. Though imitation gold possesses the physical properties, the colour, malleability, ductility and resistance to corrosion, exactly similar to natural gold, it has yet not attained the density which stands in the way of production of imitation gold

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LOCUST, ITS PERIODICITY, PHASES & CONTROL

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Locust which is oldest enemy of the farmers, has been invading our country since times immemorial and whenever its swarms appeared they caused immense damage to all kinds of crops, fruit trees, fodder, etc., resulting in famines, untold sufferings to humanity and loss of livestock due to shortage of food.

Periodicity.

Locust swarms occur in cycles depending upon the weather conditions. Since 1860 there have been some eight cycles in India according to the record available viz., 1863-67, 1869-73, 1876-81, 1889-98, 1900-07, 1912-20, 1926-31, & 1940-46, A fresh cycle is now in progress since 1949 and has so far been getting stronger every year. It was on this account that we had been hearing frequently about visitation of locust swarms in the Punjab, PEPSU, Rajasthan, Saurashtra, Madhya Bharat, Uttar Pradesh, etc. during last summer autumn. About six months ago a swarm visited Banaras and caused some damage to the standing crops. Some swarms migrated as far as Assam where they were promptly chased and destroyed soon after their appearance.

Kinds And range of Locust Activity.

There are three different kinds of locust found in India, namely (1) Desert locust—*Schistocerca gregaria* Forsk. (2) Bombay locust—*Patanga Succincta* L. and (3) Migratory locust—*Locusta Migratoria* L., out of which the Desert locust is the most dreadest one. It is denizen of desert areas and its range of activity extends from eastern states of India to north-west Africa-Egyptian Sudan and Sahera. During swarming period the swarms spread to south Europe, southern parts of U.S.S.R., north Persia, Central Africa and Afghanistan. In India they go as far as Assam in the east and Madras state in the south, but as the breeding conditions in these far off states are not favourable, they settle down in the big belt surrounded by the Punjab in the north, western districts of U. P. in the east and the northern broders of Madhya Pradesh in the south to breed during summer months.

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Phases.

The Desert locust is found in two phases. During non-swarming years the young *hoppers* which hatch out of the eggs, are green in colour and remain so till they become adult or winged locusts. Due to adverse climatic conditions their number remains limited and they are found scattered about on bushes. In years of locust activity these *hoppers* are black in colour to begin with and gradually tend to become yellow with black markings and finally emerge as winged insects. The latter are pinkish in colour in their days being immature and become bright yellow (particularly the males) when they are sexually ripe. In the green stage the *hoppers* as well as the adults which are grey coloured both in the mature and immature stage, are termed *solitary* and in black stage *gregarious*. From the observations conducted in laboratories in different zones of locust activity, it has been found that these two phases are convertible into each other. For exmple, if the green *hoppers* are kept under crowded conditions there is a tendency for them to acquire gregarious coloration in their subsequent growth and conversely if black *hoppers* are isolated they tend to become green. This is exactly what happens in nature. During years of scanty rainfall when the soil moisture which is essential for the incubation of eggs, is deficient, emergence of hoppers from the egg-clusters which are laid some 3 to 6 inches in the soil is not complete and the resultant *hoppers* get dispersed soon after emergence. Thus their progeny is continued season after season, but in years of heavy rainfall emergence is profuse and the *hoppers* tend to congregate into bands (particulary in the second generation) and finally become adults which show swarming and migratory instinct resulting in their migration from the land of their birth the 'out-break area' to distant target countries. When such phenemenon occurs in nature, locust cycle begins.

Fecundity in Locust.

A female locust is capable of laying about 800 eggs during its life time which covers a period of 4 to 6 months during summer and 6 to 8 months in winter, in clusters of about 100 eggs each. These clusters are laid at an interval of 1 to 2 weeks depending upon the weather conditions. Usually six or more clusters may be laid by a single female. In field deposits of 3 to 4 clusters are not uncommon. The life cycle from egg to the winged stage is completed within 6-8 weeks and the maturation of winged locust takes about a fortnight. Thus one generation is produced in about 2 to $2\frac{1}{2}$ months. Supposing 500 eggs are laid by a female in the beginning of the

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season, the locust population in the outbreak area will increase 500 times at the end of first generation, out of which approximately half the number will be females and the other half males. At this rate the number at the end of the second generation will multiply to 250 x 500= 1,25,000 locusts. With this speed of multiplication the density of resultant locusts swells up quickly within one or two favourable seasons and the incipient or foundation swarms appear. They then migrate to the neighbouring countries and if the climatic conditions particularly rainfall are favourable there, the swarms multiply still further tending towards the beginning of new cycle, but if these are unfavourable the number decreases and the tendency of swarm formation is either crippled or arrested.

Importance of Outbreak Areas.

From the above description it is clear why Desert locust is regarded dangerous enemy of mankind. Having vast zone of its activity from India to north west Africa it generally finds suitable conditions in one belt or the other to breed and within a short time gives out large number of swarms which invade the adjoining countries for further breeding and during their visitations cause tremendous amount of damage to standing crops, fruit trees, wild vegetation, etc.

Countries effected with locust have been carrying out intensive studies on its distribution and behaviour in their areas during the past two decades and some permanent homes round about the Red Sea and Persian Gulf coasts have been discovered and search for more is continued. One such home exists in the desert area of Rajasthan, PEPSU, Cutch and northern districts of Bombay. If the incipient tendency in these areas could be successfully controlled, the locust problem will become very simple affair, but the experience shows that on account of the political and other reasons complete control of locust in these out-break areas has been difficult and swarms have always escaped to the neighbouring countries though their intensity of attack was considerably reduced. International relationship and co-ordination for control of locust is being developed and with the intensification of observations it is hoped that modern methods of locust control will be successfully applied in such areas and the problem solved by the entomologists permanently.

Chief Methods of Control.

Control of locust require, setting up (1) anti-locust organisations and (2) employing methods for locust destruction which are effective and

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easily available. Almost all the states in northern India including the Centre have set up Anti-locust organisations which are educating masses on different methods of locust control. If public co-operation is forthcoming, it should not be difficult to fight the locust menace successfully and save food worth hundreds of millions of rupees which is subjected to their attack and is in danger of being lost during the breeding season. Hence, fighting locust is not an individual affair but a national duty of highest importance for every citizen.

The chief methods of control are :—

(1) Destruction of hoppers by driving them into trenches (12″ wide and 18″ deep.) The inner wall of the trench is kept sloping and the outer vertical. The latter is reinforced by a groove at its bottom or by overhanging tin sheets on its top in order to stop escape of the *hoppers*.

(2) Use of poison bait. (Sodium fluosilicate—1 seer, bran—30 to 35 seers and water according to requirement). The poison bait is fed to the hoppers as well as adults. A standard bait prepared by the use of 'Agrocide @ 7' containing benzene hexachloride is effective. Less than 1/30th of a pound of the insecticide in the bait can kill an acre of *hoppers*.

(3) Dusting with benzene hexachloride (5-10%) according to the stage of locust. This insecticide is available ready made in the market under different proprietory names viz., Grammexane,* Hexyclan† and Hexidole§ and can be used directly for control of locust.

(4) Burning of adults and hoppers during late night or early morning hours with the help of dry grass or flame throwers if available.

Aerial Control.

The Govt. of India carried out a very important experiment of aerial control against locust during last summer in the desert area of Rajasthan where breeding was fairly heavy. An Amercian team headed by Mr. William B. Mabee, Entomologist of the U.S.A. Department of Agriculture loaned to the Point Four Organisation, was deputed to carry out the control operations under Point Four programme. He brought 3 Piper Cub aircrafts specially equipped for sparaying insecticide called Aldrine and worked

*Obtainable from the Imperial Chemical Industries (India) Ltd. Calcutta.
†Obtainable from Noury (India) Co. Calcutta.
§Obtainable from the Geiggy Insecticide Ltd. Bombay.

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in close collaboration with the staff of the Locust Warning Organisation in the Bikaner area. Despsite lateness of rains and spotted nature of breeding, the effectiveness of spraying was amply demonstrated. While the application of Aldrin is lethal to *hoppers*, the experiment showed that even adults in the flying stage could be killed by this insecticide whose residual effect was observed to last upto 13 days. At the end of the operations Mr. Mabee was of opinion that if international anti-locust aerial corps could be established permanently in the Middle East Theatre of locust activity extending from eastern coast of Africa through Arabia, Iran, Afghanistan and Pakistan to northern India, it would change the pattern of locust control operations considerably. If his recommendation is accepted and international aerial corps established not only will the locust be brought under control permanently but the cost of operation reduced considerably.

"I quarrelled with Mohan. I would have beaten him black and blue if I hadn't been prevented".

"Who prevented you ?"

"Mohan".

"Yes, sir, I am a good singer".

"How did you learn to sing ?"

"I graduated from a correspondence school".

"Ah ! You must have lost lots of your mail".

The inspector was paying a hurried visit to a slightly overcrowded school.

"Any abnormal children in your class ?" he inquired of one harassed-looking teacher.

"Yes", she replied, with knitted brow, "two of them have good manners".

"Is this a healthy place", asked a stranger of a native of a certain region of the West.

"It sure is", replied the native. "When I came here I couldn't utter a word. I had scarcely a hair on my head. I hadn't the strength to walk across the room, and I had to be lifted from my bed".

"That is wonderful", exclaimed the stranger. "How long have you been here ?"

"I was born here".

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MODERN TECHNICAL DEVELOPMENTS IN GLASS

Dr. R. Charan,

Banaras Hindu University.

This is the age of glass. Ever since the discovery of glass by man, it has been used by him either for utilitarian or decorative purposes. The use of glass for so many diverse purposes is mainly due to some of the characteristic properties possessed by glass. In fact some of these properties have been responsible for glass being classified as one of the Key Industries. When world war II broke out, it was found that there were not enough lenses for binoculars, telescopes, microscopes and cameras in the U.S.A. They were also unable to manufacture the glass required for these lenses. The Carl Zeiss of Germany manufactured the special glasses required for making lenses. This glass was of the highest quality and was prepared by strictly guarded formulae and processes. The scientists of U.S.A. responded to the call of the industry and before long, produced glass of the required optical quality. Dr. G. W. Morey of Geophysical laboratory of Carnegie Institution of Washington started making a series of glasses using other elements. He has made glass of U_D 2.00 and now only the diamond has a higher index of 2.41. Upto now only 25 of the 92 elements have been used in combination with silica to obtain different types of glasses. Thus the possibilities of getting yet newer types of glasses are immense when the other remaining elements are made to combine with silica.

Transparency is the prime quality of glass and it is due to this quality that glass finds its use as lenses in various optical instruments, windows panes, bottles and jars for storing food and beverages. Modern research in glass technology has aimed at improving certain qualities of the glass for recognised purposes use and at widening its use. In western countries research on these lines has been phenomenal so much so that today glass stands next to steel and cement in importance.

Research in optical glass is mainly going on in Britain, Canada and U.S.A. and the landmarks in optical achievements have been as follows:—

(*a*) Anti-reflection filters and films where the reflection of light from the surface of the lens has been reduced to practically zero.

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(*b*) 200 inch glass disc for telescope made by Corning glass works on behalf of the observatory of the California Institute of Technology. The weight of the glass disc is 20 tons and it took 250 days to slowly cool it after manufacture.

In the development of chemical glass and thermal shock proof glass, a very great advancement has been made in Czechoslovakia, U.S.A. and Britain. Pyrex glass is well-known everywhere. Pyrex has now brought out Pyrex flame wares, in which one can cook food on an open flame, The constituents such as silica, alumina and boric oxide not only increase the durability of glass towards chemical reagents but also raise its thermal endurance. Fused silica, either transparent or opaque, is best in possessing both of these properties. Glass possessing the above properties is 96% silica glass or Vycor glass. Borosilicate glass with 75% silica is melted, moulded and cooled and is then subjected to heat treatment for a few hours at 500-600°C. This induces the seperation of two phases in the glass, one rich in silica and the other consisting of boric oxide and alkalis soluble in strong acid at 98°C. After washing, when such a glass is reheated at 900-1000°C, it shrinks in volume and a most durable and thermal shock proof glass is formed containing *96*% silica and *3*% boric oxide. This product is transparent and has a high mechanical strength. Glasses containg high amounts of alumina have high softening points and are being made for mercury vapour lamps and for cooking wares. Some cooking ware glasses can be made red hot and will not crack if plunged into cold water.

Pittsburg Plate Glass Company have made a plate glass which is four times as strong as ordinary plate glass. A pane of this glass resting on a cake of ice will withstand a stream of lead. A two pound ball can be dropped from six feet on this glass and will not damage it. Already there is a glass that will stop a fifty calibre bullet. Broken fragments of glass have great cutting power. Glass Technologists have been trying to prevent injury from its splenters. The most effective way of doing this is by tempering it. The Glaceries de St. Gobain of France attained success in 1929 in this venture and soon plate glass came into use for motor cars. In the Paris Exhibition of 1937, the same firm erected a glass pavillion whose walls were made of glass blocks, and the spiral staircase was made of temprered plate glass, over which thousands of persons walked up down. Now in the U.S.A., tempered glass forntage, doors and shop windows are a common sight. Tempering is being applied to miners lamps, tumblers and dishes and even insulators for carrying high tension power lines, telegraph and telephone wires.

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Another device for making safety glass is to laminate it. A thin layer of cellulose acetate or venyl acetate is sandwiched between two or more glass sheets. In U.S.A. and Britain it is compulsory by law for all motor vehicles to be provided with safety glasss. In war time such safety glasses containing several plates of glasses seperated by plastic interlayers was used for the windows of bombers and J-tanks.

Fibre glass is another modern invention. It can be woven into cloth that will not shrink, stretch, burn fade or be harmed by moisture. It is being used in drapery, for making bed sheets, blankets, and neckties. It is finding its use in electrical machineries and even in surgery.

The glass fibre has been made to combine with plastics, and a great variety of materials of great strength and durability and suitable for many industries are being made in the U.S.A. In fact glass fibre is becoming a big competitor with rayon, nylon, asbestos wool and cotton.

During the last war, India was a base for military operations and the military requirements were many. India very creditably supplied a great deal of glassware. In fact, due to war, electric lamp industry has become firmly established in the country.

It is absolutely necessary that if India is to retain the independence, she must be industrialised. It is gratifying to note that the authors of the Bombay plan have included glass industry as one of the major industries that deserves to be developed in India. Plenty of raw material, and Chemicals transport facilities, standardisation of goods and employment of foreign "Know How" still will be needed to improve this major industry to the level obtaining in foreign countries.

"There, now," cried little Daisy the other day, rummazing through a drawer in the bureau, "Grandpa has gone to heaven without his spectacles".

During a hectic day, the director of a company flashed the telephone operator several times. Receiving no response, he shouted irately into the phone, "Is there a blithering idiot at the end of this line?"

A voice replied coolly, "Not at this end, sir".

Acting under difficult circumstances the touring company was producing "The Merchant of Venice" in a small country town. "Give me my pound of flesh", demanded Shylock.

From the gallery came a voice, "Where's your ration card?"

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THE IMPORTANCE OF THE STUDY OF GEOLOGY*

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Geology, is a subject of great cultural, as well as, of immense economic value. The cultural value is derived from its close relation to scenery, as witnessed in the formation of mountains, lakes, rivers etc., and from its study of philosophical subjects such as the age of the earth, earthquakes, formation of continents, and other similar topics. It is, therefore, of special interest to Physicists, Chemists, and Biologists. It is also of great economic value, as it deals with various types of rocks, coal, petroleum, limestone, and important minerals including rare earths and atomic energy materials. It is thus of special interest to students of Mining, Metallurgy and Engineering.

The study of Geology, both theoretical and practical, touches on many branches of Natural and Applied Science. In spite of this, it has not received the proper and adequate attention which it deserves. It will, therefore, be of interest to examine the causes of the neglect of the study of this subject in the educational institutions of this country.

NEGLECT OF THE STUDY OF GEOLOGY IN INDIAN UNIVERSITIES

After the defeat of the Orientalists as the result of Lord Macaulay's famous Minute on the educational policy to be followed by the British Government in India, it was decided that Indian students should be taught Modern Sciences and Literature. A curious neglect was, however, shown towards Geology among the sciences. It is difficult to say that it was intentional or not. Although Geology found place in the Universities' curricula, it was not taught in most of the colleges till quite recently, and even at the present time its study is undertaken much less than that of the other Sciences, owing to the wrong lead given in the earlier days. The

* Abstract of the "Inaugural Address" delivered by the writer on the 18th August 1948 to the students of Mining and Metallurgy, B.H.U.

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late Mahamana Pandit Madan Mohan Malviya Jee—himself a great samskrit scholar and an orientalist—perceived the utility of modern science and introduced Geology, among other pure and applied Science subjects, in the Banaras Hindu University from almost its inception. With the exception of the Presidency Colleges at Madras and Calcutta, the subject was not taught elsewhere till then. The question of cost could not have been the reason for the universal neglect and omission of the subject, it being the least expensive subject among both physical and biological sciences. The neglect of the study of this industrially important subject may be attributed to British interests in the exploitation of Indian mineral wealth which they exclusively controlled. The Geological Survey of India then and for a long time afterwards was a branch of Government service exclusively manned by the British and from which Indians were rigourously excluded. It will, however, serve no useful purpose to rake up now the sinister motives underlying the policy of the British and foreign exploiters whose one aim was to amass great riches at the expense of the scientifically and industrially ignorant and backward people of this country. But it will be useful to bear in mind that the State should guard against our natural resources being exploited by foreigners in the future.

The present writer joined Cambridge in 1904 and studied Geology (among other science subjects) for the Natural Sciences Tripos. The names of some of his teachers of Geology are : T. Mackenny Hughes (Sidgwick Professor of Geology), Marr, Harker, Woods, Arber, Lake, Bonney, Read—almost all of them were Fellows of the Royal Society. The first public lecture in Geology which he attended at the Sidgwick Museum in 1904 was on the Scenery of the Landscape by Sir Archibald Giekie—a former Director of the Geological Survey of Great Britain. As the subject was interesting, as most topics of Physical Geology are, he followed up his studies in Lubbocks' book on Scenery and Marr's Scientific Study of Scenery.

The Age of the Earth

The age of the earth is a subject of great interest to geologists, physicists and others, not only for its philosophical bearing, but also because a great controversy raged between the christian theologians and the geologists about 70 years ago. Whereas the former put down the age of the earth at about 10,000 years on the authority of the Old Testament, the geologists simply refused to countenance this ridiculously low estimate and gave the age of the earth in hundreds of millions of years. Modern

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Physics and especially the study of Radioactivity of the rocks has amply confirmed the correctness of the estimates of the geologists. The writer's interest in this subject was aroused from his readings of the Japji Sahib of Guru Nanak and other portions of Guru Granth Sahib which support the geological estimate regarding the great antiquity of our planet: Guru Nanak sings in the Japji Sahib (hymn 21, verses 5 to 7) thus:

कवणु सुवेला वखतु कवणु कवण थिति कवणु वारु ॥
कवणि सि रुति माहु कवण जितु होआ आकारु ॥५॥
बेल न पाईआ पंडती जि होवै लेखु पुराण ॥
वखतु न पाइओ कादीया जि लीखनि लेखु कुराण ॥६॥
थिति वारु ना जोगी जाणै रुति माहु न कोई ॥
जा करता सिरठी कउ साजे आपे जाणै सोई ॥७॥

*Translation:

5. "What was that auspicious moment, what hour, what *Tithi* (Lunar day) and what was the season and what month when this world was created?"

6. "The *Pandits* have not discovered it, otherwise they would have recorded it in their *Puranas*. The *Qazis* have not found it, otherwise they would have given it in their holy book".

7. "Neither a *Yogi* nor anyone else knows that *Tithi*, day, season or month. The Creator who has made the world, He alone knows it".

Guru Nanak in the following hymn further elaborates on the nature of the universe and of this world and the vast antiquity of the time when they were created (*Maru Sohale, Mahalla*, I, *Shri Guru Granth Sahib*, p. 1035):

अरबद नरबद धुंधूकारा ॥ धरणि न गगना हुकमु अपारा ॥
ना दिनु रैनि न चंदु न सूरजु सुंन समाधि लगाइदा ॥१॥
खाणी न बाणी पऊण न पाणी। उपति खपति न आवण जाणी ॥
खंड पताल सपत नही सागर नदी न नीरु वहाइदा ॥२॥

× × × ×

वेद कतेब न सिंमृति सासत ॥पाठ पुराण ऊदै नही आसत ॥
कहता वकता आपि अगोचरु आपे अलखु लखाइदा ॥१३॥
जा तिसु भाणा ना जगतु ऊपाइआ ॥ बाझु कला आडाणु रहाइआ ॥
ब्रह्मा बिसनु महेसु ऊपाऐ माइआ मोहु वधाइदा ॥१४॥

* This is taken from the English translation of *Japji* by Colonel Bawa Jiwan Singh.

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†Translation :

1. "For unlimited period, there was darkness. There was neither heaven nor earth, there was only the boundless *Word*. There was neither sun, nor moon, neither day nor light. He alone was in a state of *Samadhi*".

2. "There was no species nor speech, neither air nor water. No creation or its dissolution nor birth nor death. Neither were there divisions of the earth, nor the seven regions; neither were there oceans nor rivers nor was there water flowing".

× × × ×

13. "There existed neither the *Vedas*, nor other sacred books, neither the *Puranas* nor was there any sunrise or sunset. There was nothing else except Himself. He was the speaker and listener. He Himself recognised Himself, the unknowable".

14. "When it pleased Him, he created the world and made it exist without any support. He created *Brahma*, *Vishnu* and *Shiva* together with Illusion (*Maya*) and Attachment (*Moha*)".

The Earthquakes

Another subject, which is of great significance to geologists as well as to laymen is that of earthquakes. Man has taken a great interest in them as the destruction caused by them often brings to his mind the idea of retribution for his sins. In the Punjab, it was a common belief that the earth is supported on one of the horns of a Bull; in the process of changing over from one horn to the other, the earth gets shaken resulting in an earthquake [in the U. P., *Shesh Nag* (शेष नाग) is the supposed agent in place of the Bull]. This physical explanation of earthquakes was very plausibly put forward by the common people in the time of Guru Nanak, who refutes it in Hymn 16, verses 4 to 6 of the Japji Sahib :

धौलु धरम दइआ का पूतु ॥ संतोखु थापि रखिआ जिनि सूति ॥४॥
जे को बुझै होवै सचिआरु ॥ धवले ऊपरि केता भारु ॥५॥
धरती होरु परै होरु होरु ॥ तिस ते भार तलै कवणु जोर ॥६॥

*Translation :

4. "The Bull is the law of nature, the offspring of God's mercy, which patiently maintains the world in equipoise".

5. "He who understands the enigma knows the truth, (otherwise) how much load a bull could bear ?"

* See footnote, page 33.

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6. "There are worlds beyond worlds; what force does bear their loads?"

Apart from the difficulty of conceiving an eternal Bull on the theory prevalent among the common folk, Guru Nanak attributes the equipoise of the world to God's mercy and refutes the "theory of the Bull" by pointing out the great weight of our world and other worlds which no Bull could support.

Although the geologist is not concerned with spiritual explanations, he has made a thorough study of the causes of earthquakes, such as volcanic activity, earth movements resulting in adjustments of the earth's crust and strata etc. The geological view finds support from the fact that earthquake activity is mostly confined to comparatively younger strata, as for instance, the Himalayan region in India—here the mountains are readjusting themselves as a result of earth movements, producing earth tremors or earthquakes if the tremors are of considerable magnitude. The older geological formations, which had had time 'to settle down', such as the peninsular region of India, are comparatively free from earth tremors or earthquakes of great severity.

The atomic fission of matter is associated with great release of energy, and sometimes with explosive violence, as has been well illustrated by the physicist on a small laboratory scale, and, in the case of atomic bombs, by the military engineering and scientific departments. May not this atomic fission process in the interior of the earth, which is associated with such tremendous release of energy, be also responsible for earthquakes? The subject of earthquakes, their causes and other matters connected with them and their destructive effects is of great interest and importance and will repay study.

The other branches of geology are Petrology, Paleontology and Stratigraphy.

Petrology: It is the study of rocks or the science of rocks. Rocks may be of two kinds: Igneous and Sedimentary (which are derived from the igneous as the result of weathering and water action).

The igneous rocks may be classified according to the process of cooling down of the rock magma from which they are formed. The liquid rock magma which lies at great depths below the surface of the earth may crystallise very slowly at those depths. Crystals which separate out on slow cooling are large and well defined. The rocks thus formed from the liquid

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rock magma at great depths as the result of slow cooling are known as *Plutonic*. They are characterised by large phenocrysts in great numbers and only a small amount of ground mass. At lesser depths, the cooling is not so slow and smaller crystals are met with in a relatively larger amount of ground mass. These rocks are called *Hypabyssal*. Again if the rock magma is poured out on the surface of the earth as in volcanic activity or fissure eruptions, the cooling is so rapid that the magma becomes glassy, with hardly any phenocrysts. These rocks are called *Volcanic*.

Again each of these groups has a chemical classification within the group, according to the amount of Silica (SiO_2), which may range from 72% in the acid rocks to about 54% in the *basic* rocks, and to about 41% in the *ultrabasic* rocks. The plutonic rocks, on this classification based on chemical composition, are thus divided: granites (72% SiO_2), Syenites (59% SiO_2), Diorites (57% SiO_2), Gabbros (48% SiO_2) and Peridotites (41% SiO_2). The other groups of rocks of the hypabyssal and volcanic types also find a similar classification.

The study of thin rock slides, under the polarising microscope, is not only interesting but unfolds a complete history of the rock and the way it had crystallised and any subsequent changes it had undergone.

Paleontology:—It deals with the study of fossils. A knowledge of the zoology of our present fauna is very helpful for the proper understanding of the fossil forms.

Similarly *Palaeobotany* deals with fossil plants. The fossils are the remains or casts of animals and plants of byegone ages and are of great value in identifying strata and fixing their geological ages. Their value to stratigraphy and in constructing the geography of former land masses is immense. This point will be further illustrated in connection with the geology of the *Gondwanaland*.

Some of the fossil deposits are of immense economic value to us: for instance, coal. It is the remains of plants and trees of byegone ages, which became buried under the earth in the past geological ages—the Carboniferous period specially—and have come down to us as treasure inherited from Nature. It is difficult to see how our civilization will fare if coal were to be eliminated from our economy.

The remaining branch of geology, to which allusion may be made, is *Stratigraphy*: it is the study of rocks or strata in the sequence in which

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they have been laid down. *The rocks which lie at the bottom are the oldest, and those at the top, the youngest.* This only holds, if no complications such as *faulting*, *folding*, or *inversion* of strata have taken place since these rocks were originally laid down. A wrong sequence may be given to a set of strata, if these abnormalities are not fully appreciated and allowed for. The controversy on the age of the Salt Range is an instance in point.

Geology of England

Perhaps the most stratigraphically complete sequence of strata is that which is found in the British Isles and any one who wishes to study stratigraphy should start with the geology of that area. There are very few formations missing in the sequence of these rocks.

Indian Geology

India falls into 3 divisions geologically: (*a*) the Peninsular India in the South, known also as the *Gondwana* series; (*b*) the Himalayan region in the North and (*c*) the Gangetic plain which lies between the two others and occupies the centre of the country. The *Gondwanaland* (peninsular India) is a very ancient land mass; it was joined to South Africa by a belt of land, now submerged in the Arabian Sea and the Indian Ocean. There is evidence for this continent both physical and that based on fossil fauna and flora of India and South Africa. The fossil flora (the *Gangomopteris* and *Glossopteris*) of South India is identical with that of South Africa. This indicates a land connection between these countries.

The physical evidence is based on the different temperatures of waters at equal depths in the Indian Ocean on the two sides of this submerged ridge as revealed by soundings. This shows the existence of this submerged ridge—part of the land connection between South India and South Africa in the carboniferous period and in subsequent geological era—which prevents these two waters from commingling and thus acquiring uniform temperature.

Except on the coast lines, the peninsular India has been a land mass since that time and only lavas of Tertiary period from fissure eruptions have been added to it.

The Himalayan Region

When the Gondwana continent extended from South India to South Africa through what is now known as the Indian Ocean, there was to the

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North of this area a vast sea, of which the Mediterranean was a part, known as the sea of *Tethys*. In later periods, the Himalayas rose as a land mass from this sea as the result of earth movements leaving a sea in the intermediate space which existed till geologically recent times but which was subsequently filled up by the large mass of debris etc. brought down by the torrential rivers from the high mountains to the north and the south; this is now known as the Gangetic plain. No solid rocks (except debris) or any sedimentary strata have yet been met with in this region in spite of deep borings which have been made.

In concluding this brief survey, it may be suggested that the study of geology, both theoretical and practical, should be encouraged not only in Colleges and Universities but also by the lay public by the formation of Geological Societies and Clubs for field work.

Missionary: "Why do you look at me so intently?"
Caunibal: "I am the food inspector".

"My husband is merely a manufacturer of waste-baskets", sighed the woman with aspirations. "It seems such a frosy occupation".

"On the contrary, there is really much poetry in waste-baskets", replied the unappreciated bard.

"It's surprising", said the Professor to his wife, "how ignorant we all are. Nearly every man is a specialist in his own particular line, and in consequence he is as narrow-minded as it is possible to be, for he knowss nothing of what other men are doing".

"Yes, dear", said his wife.

"I, for instance", he continued, "am ashamed of my failure to keep abreast of modern science. Take electric light, for example, I haven't the least idea how it works".

His wife gave him a patronising look, and smiled. "I'm ashamed of you, too! It's simple! you press a switch—that's all".

Teacher: "What was George Washington noted for?"
Ramu: "His memory".
Teacher: "What makes you think his memory was so great?"
Ramu: "They erected a monument to it".

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BIOLOGY OF LIFE

S. P. Singh, M.Sc.
(*Research Scholar*)

It is a matter of common observation that familiar things are taken for granted; Familiarity breeds indifference and dulls the edge of inquisitiveness. Life is believed to be a property of all living beings as opposed to the non-living ones. The phenomenon, however, has remained a riddle although speculation has been rife about its exact nature. Let it be confessed here, that it has elluded all the efforts of the biologists, philosophers and sages to define it in exact terms and the nature of life still remains a mystery. As Donnan says "The mystery of life will always remain, Science is not death but birth of mystery, awe and reverence". It may be said that life is an attribute of all living beings for a limited duration until death overtake them. It is intangible and invisible and associated with matter. Its relationship with matter is so close that it cannot exist independently of it. Hence, it can neither be extracted out of the living matter nor artificially infused into it. Life begets life i.e. life is derived only from pre-existing life by a process of reproduction. The initial living matter (protoplasam) of course, grows at the cost of non-living material and even increases in bulk. Manifestation of life varies in different individuals and even in the same individual at different periods of its existence. It vegetates in cysts, sports or dried seeds and appears to be absent but far from being so, it is only a state suspended animation. In the dormant state it bears resemblence to the non-living but the advent of normal conditions wakens them into active life.

Biochemists describe life as an outcome of a dynamic equilibrium in a polyphasic system consisting of proteins, fats, carbo-hydrates, sterols, lipoids, cycloses and water. Life has also been defined as a constant series of reactions by a complex substance-protoplasm-for the purpose of adjusting itself to the ever-varying conditions of the environment. According to the laws of physics, life may be said to be only a local and temporary arrest of the universal forces moving towards equilibrium. John Tyndall says 'Life is a wave which at no two consecutive moments of its existence is composed of the same particles'. Beyond this Chemistry and Physics fail to define them.

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Theories of Life

1. Old teleological theory :—It is the oldest conception of life and was based on the assumption that the different forms of life have been created by the Creator to serve some definite purpose. According to this view there is a divine plan of the world. This view is the refuge of the theologians and held sway as long as religion held sway over the minds and hearts of men, but with the advent of the scientific age these views were gradually supplanted by the mechanistic view of life.

2. Mechanistic theory :—The mechanists contend that the various manifestations of life are controlled and directed by the physical, chemical and mechanical forces that govern the inorganic world. According to them the vital processes can be explained in terms of physics and chemistry. For example, they contended that digestion is only a complex chemical reaction ; oxidation of protoplasm a form of combustion, and so on. This view gained such popularity during the first part of the last century, when in 1828 Wohler synthesised urea in Germany and Hennel synthesised alcohol in England. Before 1828 the production of organic substances was supposed to be the special property of the living organisms alone, and it was regarded impossible that any such chemical could be ever synthesised in the laboratory from simpler inorganic substances. Encouraged by this new discovery, the mechanists were naturally tempted to say, "Every thing so far investigated has turned out to have physico-chemical explanation ; and there is nothing in living matter that has not yielded or will not in future yield to the physico-chemical investigations and which will not be capable of description in the terms of ordinary concepts of physics and chemistry". They found in living objects only a very complex physico-chemical system exhibiting the properties of life, so long as it is held in a dynamic equillibrium. In support of their arguments they point out the familiar biological experiment of removing a frog's heart from its body, maintaining its beat by profusing it with suitable saline medium, arresting its rhythm, and restarting it by changing the constituents of the medium. Similarly, a muscle can be taken off from an animals' body with the nerve and made to contract through electrical stimuli. Pieces of tissues from an embryo can be grown in artificial culture and maintained for a long time with certain precautions. The mechanist thus argues that an organism like a non-living machine, consumes potential energy in form of food, and transforms it into active energy in forms of motion, heat sound, probably also magnetism and in certain cases into light and electricity. They argue further that life itself is rendered functionless and even ceases to exist when deprived of oxygen.

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No doubt this view provides a wonderful explanation as far as isolated parts or functions of individuals are concerned. But there is much in life that elude physico-chemical explanations. This view will certainly not hold true in case of certain abstract properties of life i.e. thinking, intelligence, beauty etc. This remains most difficult flaw in the mechanists' view to be often criticised by their opponents.

3. Vitalistic theories :—

(*a*) Substantial vitalism :—This view though essentially in confirmity with the previous one differs in the assumption of the existence of a mysterious vital force, a kind of Life Spirit, governing the various activities of life. Some of the supporters have taken it to be a supernatural force and therefore incapable of being measured or analysed; while others belive in the likelihood of its being another kind of natural force that has so far escaped our investigations. This theory does not have any scientific basis and at the same time, the very assumption on which it is based is distinctly defective. The supporters of the view, though themselves having no definite evidence in their favour, do not hesitate to challange the mechanists for the abstract phenomena of life mentioned before.

(*b*) Emergent vitalism :—This theory though comparatively of much recent origin appears to bear more truth than the previous ones. It suggests that life is an emergent quality of a complex physico-chemical combination of inorganic matter to form a living individual. For instance, when a mixture of two or more substances (salt, sugar etc.) exhibit just a combination or mean of the properties of the individual constituents, its properties are Resultant. On the other hand, if, substances combine in such a way so as to produce an entirely new substance having altogether different properties from those of the constituents, its properties are said to be emergent. Water may be taken as an example of possessing emergant properties-quite different from those of either Hydrogen or Oxygen which combine to form it.

(*c*) Holism or Wholism :—Another theory having certain things common with Emergent vitalism, and probably originating from the same was put forward by General J. C. Smutts in terms of Holism. He says, "A whole is more than the sum of parts, has something internal, some inwardness of its structure

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and function, some specific inner relation, some internality of character or nature, which constitutes that more". This view is based on the understanding that life is an outcome of wholeness of structure.

There is no doubt that a whole is more than the sum of its parts. There is a tendency in a matter in a lower level to get transformed into substances of higher and higher organisation. It begins with the formation of atoms molecules; and with the increasing complexity of internal structure, and subsequent emergence of new properties, substances of higher grades are produced. In this way, protoplasm—the basic material of life acquires certain additional properties than the elements (Oxygen, Hydrogen, Nitrogen, Carbon, Sulphur, Phosphorous, etc.) of which it is formed. Representing these additional qualities by M (something more) we can formulate the theory in the following manner.

Inorganic matter+M.....protoplasm.
Protoplasm+M.....cell
Cell+M.....Tissue
Tissues+M.....Organ
Organs+M.....Organism or Individual

Mind, intelligence, personality represent the increasing stages of the manifestation of the wholeness, beyond which remain the ultimate ideals of truth and goodness. Thus in a living being, life and matter do not remain separate, but it is the wholeness of the matter which retains the life. Destroy this wholeness and the life disappears, leaving the matter at a low level of structural organisation. Life and matter are two unseparate counterparts of a living wholeness. The differences being in their mutual behavious that life can never withstand their separation while the matter does through retrogression to a lower stage.

The various theories discussed above are mere conceptions of biologists seen from different angles and interpreted in different ways. The subject itself is more of an ethical and philosophical nature. There, yet, remains much to be discovered before this intricate problem may be successfully solved. Comparatively, the first theory the teleological one has little than its historical importance. The mechanists view, on the other hand, is capable of explaining certain isolated phenomena of life but hopelessly fails to account for the abstract ones. Life to a biologist certainly means something more than the properties of living matter. The substantial vitalism, again, assumes the interference of some mysterious spirit whose

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existence is hardly plausible to a scientist. It conceals our ignorance under a special term. The last two viz. the Emergent vitalism and Holism though appear to carry sufficient truth with them can hardly become convincing. They have much in common and may be regarded two different ways of expression, conveying the same ideas. Lastly, a person having examined them one and all may still find it difficult to differentiate whether life is the cause or the consequence of the organisation as expressed in the following lines of Omar Khayyam.

Myself when young did eagerly frequently,
Doctor and Saint and heard great argument,
About this and about, but ever more
Came out by the same door wherein I went.

While concluding, it may be said that the inferences of a scientist are always based on direct observations, which in this case is rendered impossible due to the very abstract nature of life. Science has a vast potentiality of creating miracles and solving mysteries, as it has been doing from day to day. To quote Von Baer, "Science is in its source eternal; in its scope unmeasurable in its problems endless; and in its goal unattainable". It well deserves our confidence which it has rightly won. No wonder, a time may come, when scientists may also succeed in producing life in the laboratory from non-living matter, which will undoubtedly be mans' greatest victory over Nature.

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THE MYSTERIES OF LIGHT

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It is ingrained in every healthy mortal to love light. The child, for instance, before the age of reason seeks light and abhors darkness. The animals, unless the sun is too hot, prefer taking rest in the sun to shade and the plants above all show a sort of magnetic attraction for sunlight.

The mysterious sun has been acknowledged as the source of both life and light from very early times. Light, again, is looked upon as the giver of health and happiness and as the power that defeats the darkness closely associated with death and destruction.

Apart from this, sun cure is known to the world from as early times as the age of earth itself and photic stimulation is an invaluable tool in the hands of the modern therapeutist. Through this most of the deficiency diseases can now be successfully treated. Many of the metabolic diseases are also amenable to light treatment. Cases are not infrequent where the unique power of radiation has gone as far as causing rejuvenation.

It is true that the physiological activities, growth, differentiation and development of plants depend upon the inter-action of a number of factors, both environmental and genetical. But of all the conditioning factors, light is definitely one of profound importance to the biological universe. It is one of those variables that are closely associated with the properties of matter and regulate not to an inconsiderable extent the basic phenomena of assimilation and growth in plants.

Light reaches the earth's surface in the form of electro-magnetic waves varying in lengths from 2,900 to approximately 20,000A°. The plants by virtue of their unique power entrap the light energy thus available and prepare the food not only for themselves but for the entire existing world. If critically analysed, it is abundantly clear that 'all flesh is grass' and that the present civilization rests on nothing but the entrapped energy of the sun in plants.

If, however, stem elongation is taken as the index of plant growth, it is found that in most cases growth is more at night than during the day.

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Apparently then, these observations give a set back to the importance of light in plant growth. But the fact, however, remains. Every action needs energy, a push, a stimulus. Is it then darkness that gives this push ? No. It is again the stimulus of the same stored energy of the sun which is responsible for this increased growth.

In considering the effects of light on plants, its three components, viz., the intensity, the duration and the quality must necessarily be taken into account. But these components, at any point on earth's surface, vary in a definite manner with the time of the year, altitude and latitude and may be modified even further by atmospheric absorption and scattering and by local obstructions due to topographical features, plant formations etc. Knowing these variations of quality and specially of the extreme fluctuations of intensity from minute to minute, day to day and season to season of solar radiation, one might conclude that plants are insensible to most of these variations and that they are entirely indifferent to these stimuli. But by exceeding or receding the specific limits one is convinced that the plants do respond to these stimuli and that they are greatly attuned to changes in them. Continuous increase in the duration or the intensity of light, thus, brings about definite fundamental modifications in plant production.

Of the above three components of light, the position of daylength fluctuations is rather unique in the economy of plant life. Its intimate association with plant growth was realized as early as the days of John Ray (1686) and Linnaeus (1732). Among the modern investigators, an intensive study of this problem has been made by Garner and associates of the Bureau of Plant Industry, U.S.D.A., and it is they who have designated this phenomenon as 'Photoperiodism'.

With the discovery of photoperiodism, investigations in the temperate region had been fast engaged in the formulation of the laws of plant growth in relation to light requirements. On the basis of their manifold researches, the American workers Garner and Allard pointed out that a large group of plants is definitely sensitive to changes in the daily photoperiods. This group includes some plants that show an early flowering in short days, while there are others which behave similarly in long days. The former they termed as '*short-day*' and the latter as '*long-day*' plants.

Since valid generalizations in biological phenomenon are exceedingly difficult of attainment, it is not surprizing to note that there are also many

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plants that are insensitive to photoperiodic fluctuations. They have been found to flower both in long and short days and are called by the above workers as '*intermediates*' or '*day-neutrals*'.

Basing their classification on fixed critical limits, Garner and Allard considered the daily photoperiod as the decisive factor in the initiation and completion of the reproductive process in plants. This system of classification though valuable in many respects appears to be entirely empirical. Whether it is at all applicable to tropical plants is a problem all important in itself. Most of the crops, e.g., lesser millets, maize, Sorghum etc., grouped by these workers as short-day, are almost invariably cultivated in this country in the longest days of the year. Some of them when grown, on the contrary, in short days are found to be associated with poor yield and with several abnormalities, for which the theory of photoperiodism fails to provide an adequate explanation.

The great importance of light in plant production, however, does not end with a consideration of the above few facts. Of much more significance is the quality of light and a considerable amount of work has been carried out in regard to the effect of each of the wavebands that constitute the solar spectrum. But with the development of the science of physiotherapy, the attention of the modern investigators has more been diverted to the determination of the effect and usage of the invisible part of the spectrum, rather than of the visible.

The study of the responce of plants to invisible form of radiation has been more vigorous in recent years on the introduction of suitable sources of radiation and on the revelation of the fact that of the total emission made by the sun only 13 per cent is visible, while all the rest is invisible. The invisible emission includes about 50 to 80 per cent infra-red and about 7 per cent ultra-violet.

Now that everything that exists in nature has a definite cause for it and so may be having the presence of ultra-violet and more so that of the infra-red as it constitutes the greater part of the solar energy. It has been reported by some workers that plants grown under the visible plus the infra-red are characterized by longer internodes and broader leaves. They emphasize that for a valid evaluation of the effects associated with the visible part of the spectrum due consideration must be made to the effects following exposure of plants to infra-red.

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It is believed that protoplasm absorbs food, infra-red and ultra-violet lights rather readily and of these it is specifically the ultra-violet energy which seems to be closely associated with the chemistry of every living animal and vegetable cell. When nature brings about a rapid absorption of these rays, they should not be devoid of usefulness. The ultra-violet part of the spectrum has also been considered by some to be maximum effectiveness towards red pigment production of the peels of apples, stems of buckwheat and leaves of lettuce, closely paralleling the region of maximum antirichitic effects in animals. Some workers, including the author himself, claim to have obtained favourable effects upon seed germination and plant growth through ultra-violet treatment. Such observations are confirmed by the recent findings of Shull and Lemon of U.S.A. who attribute the relatively long ultra-violet rays to be causing beneficial effects in plants. They have designated this region of ultra-violet as '*biotic*' against the 'abiotic' which is apprently associated with harmful effects on plants.

The Rontgen rays which occur in a very small percentage in nature are also characterized with usefulness in many different ways. Effects following treatment with these rays are presumed to be directly proportional to the intensity of the dose. Some investigators recon these extreme rays as radiant stimulants and associate the shortness and frequency of these rays to the more important feature of light, viz., the stimulus.

According to another group of scientists, these invisible rays are nothing but lethal carriers, destructive in action and depressent in growth. They report that the stoma does not open and the chlorophyll lacks in rumen under the influence of infra-red rays. Others report organismal deformities and dwarfed growth following treatment with X-rays.

In general, then, to some these extreme rays mean the lethal carriers which inhibit growth and depress the life process, while to others they are the radiant stimulants that supply a push and furnish energy for a rapid completion of the so-called developmental stages. Amid such baffling observations, the true significance of light yet remains a mystery.

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गीत

(कैलाशनाथ त्रिपाठी—तृतीय वर्ष आर्ट्स)

मैं हूँ राही दूर देश का।
मेरे चरणों की छाया में गतिपलती रहती है।
पथ-शेषो पर जग मेरे, इतिहास सजाया करता।
जीवन की छाती में धड़कन का सर्जन कर देता;
रज कण को छू एक नया आकाश बनाया करता।
झंझा से मेरा है परिचय॥

मेरा विद्रोही स्वर विस्तृत शून्य संभाल न पाता;
धरती के आंचल में जल जल उठते तब अंगारे।
और बदलने लगती हैं पिछली सारी सीमायें;
कुहरे के सागर में उलझी ज्योति मचला उठती है।
मैं हूँ दीपक राग अचंचल॥

प्रकृति मुझे भर लेती है अपने मृदु भुज-पाशों में;
प्राण लुटा देती है हंस हंस, गा गा, मधुर तराने।
अरमानों में सिमटा जो तूफान उमड़ उठता है—
जिनमें हर पल डूब कगारे बनते एक कहानी।
अपना है संसार निराला॥

प्रात-क्षितिज में भर जाती जब लज्जा की रेखायें।
हंस हंस पड़ती कलियों के घर बज उठती शहनाई।
और अनिल पर झूम निकलता करके राग सवारी;
दिग्वधुओं के उत्तरीय भी सरक सरक आते हैं।
लेता हूँ भर एक नजर में॥

सांझ सरकती, रजनी के घर दिये जलाये जाते;
सिहर, लरकता, चांद ज्योत्सना की गोरी बाहों में।
सरिता के चुप अन्तर में कोई हलचल भर देता;
अमृत की वर्षा में डूबी डूबी सी ओशफाली।
हलकोरो से भर जाता उर॥

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जब अषाढ़ के दूत व्योम में बादल-राग सुनाते ;
सप्त रश्मियों के स्वर पल पल उड़े चले आते हैं ।
चपला आ, आ, पास कोई सन्देश सुना जाती है ;
गीली आखों मे बुदों के ज्वार छलक आते हैं ।
क्षण भर कर लेता हूँ चिन्तन ॥

पतझर का कर्कश स्वर डूबा वासन्ती रागों में ;
मौर सजाये चला अंक में भरता जब तीसी को ।
खड़ी सिहरती लता कामिनी सी, रसाल छाया में ;
कोयल का पंचम स्वर मन मे तिरा तिरा फिरता है ।
भार मिटाता संघर्षों का ॥

इसी तरह गाकर, हंसकर, वरदान लुटा जाता हूँ ।
पीछे अवशेषों से चल कितने आगे आयेंगे ।
मिट कर के भी भाग्य लेख की तोड़ूंगा परिभाषा ,
आंसू के सुमनों से ये वीराने भर जायेंगे ।
सहलायेंगे थकें कदमको ॥
—मैं हूँ राही०.....

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रीति कालीन कविता की सामाजिक पृष्ठभूमि

श्री बच्चन सिंह एम० ए०

वर्ण्य-विजय की दृष्टि से रीतिकालीन कवियों की कृतियों को हम तीन कोटियों में विभाजित कर सकते हैं—काव्यशास्त्र, नायक-नायिका-भेद और अलंकार-निरूपण। इन तीनों तरह के ग्रंथों के अनुशीलन से यह स्पष्ट हो जाता है कि उन कवियों की दृष्टि लक्षण के अनूरूप सरस उदाहरण प्रस्तुत करने की ओर अधिक रही है। लक्षण-कथन का हलकापन इस बात का द्योतक है कि लक्षणों का गंभीर शास्त्रीय विवेचन उनका अभीष्ट कभी नहीं रहा। रस की दृष्टि से विचार करने पर श्रृंगार की सरिता अपने दोनों कूलों को डुबोती हुई बहती दिखाई पड़ेगी। सामान्यतया सभी कवियों का श्रृंगार-वर्णन शरीरी, स्थूल, अस्वास्थ्यकर और भोग प्रधान रहा है। शरीर के बाह्यांगों के वर्णन-विश्लेषण में उनकी सारी शक्ति केन्द्रित हो गई और प्रेम या श्रृंगार के मानस पक्ष के सौन्दर्योद्घाटन की ओर किसी की दृष्टि न गई। घनानंद ऐसे दो-एक कवियों को अपवाद ही मानना चाहिये। बहुज्ञता और अलंकार शीलता का प्रदर्शन उस काल की सार्वभौमिक विशेषता है।

रीतिकाल के लोक वाह्य स्थूल श्रृंगार-चित्रण को समझने के लिए उस समाज और वातावरण को समझना होगा जिनमें उन कविताओं की सर्जना की प्रेरणा अथवा उत्तेजना मिली है। जिस समाज में जो साहित्य निर्मित होता है उसमें समाज की सभी प्रमुख विशेषताएँ—आशाएँ, आकांक्षाएँ, अंतर्विरोध, अर्थनीतियाँ, स्वस्थ अथवा रुग्ण भावनाएँ आदि अपने ढंग से प्रतिफलित होती हैं। रीतिकाल के सामंतीय वैभव, तथा निर्बाध विलास के रुग्ण वातावरण में सांस लेता हुआ साहित्य जीवन-स्पंदनों से हीन और अस्वस्थ हो गया।

आचार्य रामचन्द्र शुक्ल के मतानुसार रीतिकाल संवत् १७०० से १९०० तक माना जाता है। शाहजहाँ के समय में मुगल-वैभव अपनी चरम सीमा पर पहुँच चुका था। उसके अनन्तर मुगल-साम्राज्य तेजी से पतनोन्मुखी होता गया। औरंगजेब के बाद तो मरणासन्न मुगलसाम्राज्य अपनी उखड़ी साँसे गिन रहा था। आर्थिक दृष्टि से सारा साम्राज्य दो वर्गों में विभक्त था—उत्पादक अथवा शोषित और भोक्त अथवा शोसक। उत्पादक वर्ग का अधिकांश श्रमफल भोक्तावर्ग की विलास-लीला की दृष्टि में व्यय होता था। रीतिकालीन कवि भोक्तावर्ग के आश्रय में पला करते थे, अतएव उनके संस्कारों को आत्मसात् करना उनके लिए स्वाभाविक था। स्वयं कवि गण प्रायः मध्यमवर्ग के होते थे, किन्तु दरबारी वातावरण में रहते रहते इन लोगों के मध्यमवर्गीय संस्कार बहुत कुछ लुप्त हो चले थे। जो कुछ गार्हस्थिक वातावरण, गाँव के उत्सवों, त्योहारों आदि का वर्णन इनकी कविताओं में आ गया है वह इनके पूर्व संस्कारों के कारण। किंतु इन वर्णनों के चित्रण में ग्राम्यजीवन की सात्विक झाँकी न उपस्थित कर रीतिबद्ध सामंतीय छाया ही मिलेगी।

अस्तोन्मुखी मुगलसाम्राज्य के बादशाह, उनके अधीनस्थ राजे-महाराजे, उच्च कर्मचारी, सामंत आदि निर्बाध बिलासिता में आकंठ मग्न थे। जीवन-निर्वाद की कठिनाइयों से मुक्त

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रहकर उन लोगों ने अपना सारा समय सुरा और सुन्दरी के हाथों में सौंप दिया था। इन्द्रभवन को भी मात करने वाले उनके गगन चुम्बी राज महल, कुबेरसे भी स्पर्धा करने वाली उनकी अतुल धनराशि, स्वर्ण-रत्न-खचित वस्त्र उनके वैभव-विलास की सूचना देते हैं। बिहारी का प्रसिद्ध दोहा 'नहिं पराग नहिं मधुर मधु' उन लोगों की शगल का अच्छा परिचायक है। 'देव' के निम्न-लिखित कवित्त में तत्कालीन वैभव की झाँकी देखिए—

उज्जल अखंड खंड सातएँ महल महा,
मंडल सँवारो चंदमंडल की चोट ही।
भीतर ही लालनि के जालनि विसाल जोति,
बाहर जुन्हाई जगी जोतिन की जोट ही।

नागरकों के जिस वैभवशाली वर्ग का उल्लेख कामसूत्र में हुआ है वह वात्सायन की कल्पना मात्र नहीं है। नागरक का भवन-विन्यास, अद्भुत साज-सज्जा अकल्पनीय अवकाश असाधारण हैं। विद्वानों ने वात्सायन का काल ईसा की दूसरी शताब्दी के लगभग माना है। सामंतीय ढाँचे का अवकाशभोगी वर्ग कुछ इसी तरह का होता है। देश की सामाजिक अवस्था के परिवर्तन के साथ नागरिकों की स्थिति भी बदली। इसका उल्लेख करते हुए आचार्य हजारी प्रसाद द्विवेदी ने 'हिंदी साहित्य की भूमिका में लिखा है—"अवस्था परिवर्तन के साथ ही इस बात का अनुभव किया जाने लगा कि कामसूत्र अपने विशुद्ध रूप में नागरों के काम का नहीं हो सकता। इसलिए उसके अनावश्यक अंग छाँटकर केवल काम की चीजों का आश्रय करके बहुत से ग्रंथ लिखे गए। कालान्तर में यही बाद के लिखे गए ग्रंथ मध्यकाल की सामाजिक अवस्था के अनुकूल बनाकर हिंदी में ग्रथित हुए" रीतिकाल में भारतीय संस्कृति के साथ सभी संस्कृति का मिश्रण हो चला था। इसका स्पष्टप्रभाव रीतिकालीन कविताओं की अद्धात्मक उक्तियों पर पड़ा है। इस मिश्रण के कारण आदिजात्य वर्ग की विलासिता नग्नता की सीमा पार का गई।

उत्तरकालीन कामशास्त्रों में 'अनंग रंग' और 'रति रहस्य' प्रमुख हैं। 'अनंग रंग' की रचना लोदियों के समय में हुई और 'रतिरहस्य' संभवतः और बाद की कृति है। इन रचनाओं में 'नागरकों का प्रकरण नहीं सम्मिलित है। इसका अभिप्राय यह है कि इस समय नागरक वर्ग नहीं रह गया था। 'अनंग रंग' के प्रारंभ में ही कहा गया है—

कौतुकाम रसिकानुरंजनं शास्त्रमुत्तमिदं विरच्यते।

आगे चल वही ग्रंथकार अपने उद्देश्यतको और स्पष्ट करता है—

निःसारे जगति प्रपंच सदृशे सारं कुरंगी दृशा—
मेकं भोग सुखं परात्म परमानंदेन तुल्यं विदुः॥
तज्जात्यादि विवेकमूढं मनसो लब्ध्वापि नानांगनाः।
संवदन्ति न कामहृय विकलाः पश्वादिवन्मानवाः॥

'रतिरहस्य' के लेखक आचार्य कक्कोक के काम शास्त्र के प्रणयन के उद्देश्य की बानगी लिजीए—

असाध्यायः सुखं सिद्धि, सिद्धायाश्चानुरंजनम्।
रक्तयाश्चरतिः सम्यक् कामशास्त्र प्रयोजनम्॥

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उपर्युक्त उद्धरणों से तीन निष्कर्ष निकलते हैं—पहला यह कि वात्सायन की स्वस्थ काम-कल्पना का सर्वथा तिरोभाव हो गया था, दूसरा यह कि इन आचार्यों का कार्य विलासिता की अग्नि में आहुति देकर उसे प्रज्जवलित बनाए रखना था। तीसरा यह कि नागरकों का स्थान रसिकों ने ग्रहण कर लिया था और इन कामशास्त्रियों का कार्य उनका अनुरंजम था। इन रसिकों की दृष्टि भोगप्रधान और बहु-मुखी थी। आभिजात्य वर्ग की विलासोन्मुखी संस्कृति का प्रसार उच्च मध्यम वर्ग तक पहुँच चुका था। इसलिए रसिकों की सीमा-रेखाओं को यहाँ तक बढाना पड़ेगा। इन रसिकों के मनोरंजन के लिए ही अनेक ग्रंथों की रचना की गई।

'रसिकन के रस को कियो नयो ग्रंथ रसराज'

—मतिराम

'रसिकन के बस करन को, कीन्हों जगत विनोद'

—पद्माकर

रसिक रीझि हैं जानि, तौ ह्वैहै कवितौ सफल

—द्विजदेव

प्रेम-समुद्र में डुबकी लगानेवाले रसिकों का चित्र देखिए—

गिरिते ऊँचे रसिक मन, बूड़े जहाँ हजार।
वहै सदा पशुनरन को, प्रेम पयोधि पगार॥

बिहारी, देव, मतिराम, पद्माकर आदि रसिक कवि थे। रसिको को रिझाने के लिए इन लोगों ने श्रृंगार की झड़ी लगा दी। ज्यों ज्यों समय व्यतीत होता गया विलासिता की मात्रा में अभिवृद्धि होती गई। मुगलों के अंतिम काल में विलासिता चरमोत्कर्ष पर पहुँच चुकी थी। पद्माकर, बेनी प्रवीन, लाव आदि की रचनाओं में श्रृंगार का नग्न दर्शन किया जा सकता है। बिहारी पद्माकर के समय में लगभग दो सौ वर्षों का अन्तर है। एक ही विषय पर लिखी गई दो रचनाओं से दोनों के दृष्टिकोणों तथा उस कालविशेष की ह्रासोन्मुखता का पता लग जायगा। सुरतान्त का वर्णन देखिए—

लहि रतिसुख लगियें गरें, लखी लजौहीं नीठि।
खुलत न मो मन बँधि रही, वहै अधखुली डीठि॥

बिहारी—

अधखुली कंचुकी उरोज अध-आधे खुले,
अधखुले वेष नखरेखन के झलकैं।
कहै पद्माकर नवीन अधजीवी खुली,
अधखुले छहरि छरा के छोर छलकैं॥

काव्यगत सहज उन्मेष खो देने के कारण कवि में पांडित्य प्रदर्शन और अलंकरण प्रियता बढ जाती है। मनोवैज्ञानिक दृष्टि से काव्यात्मक उत्कर्ष के स्थान पर शैली की खराद कवि की अक्षमता का द्योतक है। वास्तविक बात यह है कि उस कालके उत्तरार्ध में ऐसे बहुत से कवि हुए जो प्रतिभा की दृष्टि से हीन थे। इधर उधर से प्राप्त कुछ शास्त्रीयज्ञान के आधार पर

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तुक मिलाकर पाँचो सवाङ्गें में सम्मिलित होना चाहते थे। इन्हीं को दृष्टि में रखकर ठाकुर ने कहा है—

सीखि लीनो मीन मृग खंजन कमल नैन,
सीखि लीनो जस औ प्रताप को कहानो है।
सीखि लीनो कल्पवृक्ष, कामधेनु चितामनि,
सीखि लीनो मेरु और कुबेर गिरी आनो है।
ठाकुर कहत याकि बड़ी है कठिन बात,
याको नहीं भूलि कहै बाँधियत बानो है।
डेल सों बनाय मेल त सभा के बीच,
लोगन कबित्त कीबो खेल करि जानो है।

लेकिन यह कहना कि रीतिकाल में प्रतिभा सम्पन्न कवियों की कमी रही है सत्य के विपरीत होगा। बहुज्ञता प्रदर्शन और अलंकरणशीलता के मूल में दरबारी विद्वन्मंडली रही है। इस मंडली में काव्य का सहज भाव सौन्दर्य अपेक्षित नहीं था, वरन् एक क्षण के लिए सभ्यों को चमत्कृत कर देना ही उनकी सफलता का मानदंड था। जीवन में आदर्शहीनता का यही स्वाभाविक परिणाम होता है। जीवन की सरलता के ऊपर कृतिमताओं का इतना स्थूल आवेष्ठन सहज अभेद नहीं है। जन-जीवन से दूर कविता 'पंडितों' और 'प्रवीणों' की वस्तु हो गई थी।

पंडित और प्रवीनता को जित्त हरै सो कवित्त बनावै
दास कविचन्द की चरचर बुद्धिवन्तन को सुख दै सब ठांहि

—काव्यनिर्णय

जो यह कंठाभरण को, कंठ करै सुख पाय।
सभामध्य सोभा लहै, अलंकृती ठहराय॥

—कविकुल कंठाभरण

यह अलंकृति और भावशून्यता उस काल की चित्रकला तथा संगीत-विधान में भी घर कर गई है। शाहजहाँ के समय से ही चित्रकला की मौलिक भावाभिव्यक्ति समाप्त हो गई थी। भावों के स्थान पर रियाज़ और मिनाकारी का प्राधान्य हो गया। जिस तरह से जीवन में बाह्य साजसज्जा पर विशेष दृष्टि रखी जाती थी उसी तरह बाह्यांगों के आलेखन में कला-निपुर्णता दिखाई गई। मुगलशैली से प्रभावित होने पर राजस्थानी शैली में भी मौलिकता का अभाव हो गया। जयपुर की कलम में दरबारी संस्कृति अत्यधिक उभरी हुई है। हाँ, कांगड़ा-शैली स्वच्छन्दतावादी रीतिकालीन कविताओं की भाँति भावात्मक अवश्य है।

संगीत का भी यही हाल रहा। तानसेन के अनुयायियों ने संगीत को अलंकृत किया। मुहम्मदशाह रंगीले के समय में नई शैलियों का भी जन्म हुआ, किंतु इनमें उत्थानमूलक सृजन-प्रेरणा के स्थान पर ह्रासोन्मुखी विलासिता का ही अधिक बोलबाला है।

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शहर के कुत्ते

श्री विश्वनाथ पाण्डेय एम० ए०, एल० एल० बी (आनर्स)

शहर में कुछ आवश्यक वस्तुओं को खरीदने के उपरांत मैंने तिवारी जी के सामने कुछ नाश्ता करने का प्रस्ताव रखा। स्वीकृति पाने में विलंब न हुआ क्योंकि तिवारी जी पहले ही अपना विचार प्रकट कर चुके थे। बंगाली बाबू की मिठाई की दुकान शहर में काफ़ी प्रतिष्ठा प्राप्त कर चुकी थी। दुकान के सामने चारपांच टीन की कुरसियां पड़ी थी और धाएं बगल काठ के दो-तीन बेंच। बेंचों के हरएक जोड़े पर कीड़ों ने दरारें बना दी थीं और ऊपरी सतह पर कुछ मनचले लड़कों ने बंगाली बाबू की निगाह बचाकर नक्काशी का काम सीखा था। फिर भी वे बेंच, जिनपर बुढ़ापे का आक्रमण हो चुका था, आठ-दस छोटे-मोटे मनुष्यों का भार सहन करने के लिये अयोग्य न थे। कुरसियों के पिछले पैर नाली के छोर से दो-तीन अंगुल पीछे थे। अगर कोई सावधानी के साथ उसपर न बैठे तो शायद उस कुरसी के साथ-साथ उसे भी नाली की शरण लेनी पड़े। कुरसियों के आगे थोड़ा स्थान था, जहाँ पर खड़े होकर बंगाली बाबू से भाव-ताव किया जा सकता था।

तिवारी जी औसत से कुछ ज्यादा मोटे थे, इसलिये उन्होंने बेंच पर ही बैठना उत्तम समझा। मैंने भी उनका साथ दिया। 'चर....र....र' के साथ बेंच ने लंबी सांस ली और हमलोग परेड करने वाले सिपाहियों के समान एक साथ उठ खड़े हुए। आखिर जब बंगाली बाबू ने स्वयं सान्त्वना दी तो हमलोग फिर बैठ गए। बैठने की देर थी कि मिठाइयों का आना शुरु हो गया। तिवारी जी एकाग्रचित्त हो रसास्वादन करने लगे।

मैंने मिठाई के टुकड़ों को निगलना ही चाहा था कि एक लड़का मेरे सामने आ खड़ा हुआ। उम्र दस साल के लगभग होगी। एक गंदे चिथड़े को लपेटे था और सब अंग नंगे थे। शरीर काला हो चला था और कहीं-कहीं गहरे रंग की कालिमा लिए हुए कुछ धब्बे दृष्टिगोचर हो रहे थे। पेट पिचका हुआ था आंखे अन्दर धंस रही थीं। मुंह पर चावल के कुछ दाने लगे थे। बाल कुछ छोटे-छोटे थे पर परस्पर प्रेम को कायम रखने के लिए आपस में गुथे पड़े थे। हाथ की हड्डियां हद से ज्यादा पतली थीं और हथेलियों का मांस न मालूम कब हड्डियों का साथ छोड़ चुका था।

"बाबू, भूखे हैं!" दांत बाहर निकल गए और हाथ आगे बढ़ने लगे। मेरे हाथ की मिठाई ज्यों-की-त्यों पड़ी रही और मैं एकदम उसे निहार रहा था।

"भाग, भाग, अरे बंगाली बाबू आपने यह क्या यहां जमघट लगा रखा है! हटाइये इन सबों को यहां से।"

मैंने समझा तिवारी जी मेरे सामने वाले भिखमंगे को डांट रहे हैं, पर असल में बात यह थी कि उनके आसपास भी दो भिखमंगे खड़े थे, जिनमें एक लड़का था और एक लड़की। उस लड़के की भी सूरत-शकल और पहनावा, पहले वाले लड़के जैसा था। उम्र में वह पहले वाले से कुछ छोटा था। लड़की की उम्र उन दोनों से कम थी। बाल लंबे-लंबे और कुछ घने थे, पर उन में कुछ घनिष्टता नहीं थी। अपने व्यक्तिगत विकास के लिए नीचे की तरफ लपके पड़ते थे। आंख, नांक और मुंह को छोड़कर गरदन के बाकी हिस्से को बालों ने ढक लिया था। मगर

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पैनी दृष्टि से देखने पर गरदन के पतलेपन का अन्दाजा मिल सकता था। मालूम होता था कि एक पतली लकड़ी पर एक हांडी औंधाई गई हो। बदन पर और कोई कपड़े नहीं थे, सिर्फ एक पुराने कपड़े का टुकड़ा कमर की हड्डियों पर झूल रहा था।

बंगाली बाबू ने तिवारी जी की आज्ञा का पालन किया। "भाग, भाग"! की जैसे झड़ी लग गई। वे तीनों अपने-अपने स्थान से दो-चार कदम पीछे हट गए। मैं गौर से उन सबों को देख रहा था।

"आप तो बैठे रह गए, हटाइए भी इन सबों को। इनका तो यह पेशा है। जहां चाहा वहां जूट गए।"

तिवारी जी के सुझाव का ख्याल करते हुए मैंने एक-दो ग्रास खाने का उपक्रम किया, पर न मालूम क्यों खाने की इच्छ जाती रही।

उधर वे तीनों एक दूसरे को घूर-घूर कर देख रहे थे और कुछ फुसफुसाहट के साथ अपना अपना क्रोध शांत कर रहे थे।

पहला लड़का कह रहा था—"तू तो उस दुकान पर गई थी, फिर यहां क्यों आई? अब चल तू किसी और दूकान पर, नहीं तो तेरी हड्डी पसली एक कर दुंगा।" दूसरे लड़के ने उसका समर्थन किया—"शाम से अभी तक तो चार दफे पा चुकी, फिर भी तेरा पेट नहीं भरा। डाइन कहीं की।" लड़की दोनों से कमजोर थी, इसलिये उसे सफाई देनी पड़ी।

"हमें गाली न दो। चार दफे पाया तो मॉ को नहीं दिया? तुम लोग तो सब हड़प कर जाते हो। उस आदमी की मिठाई, जो नाली में गिर पड़ी थी, उसमें से कुछ भी तो मुझे नहीं दिया। बतलाया भी मैंने ही था।"

मैंने हाथ के इशारे से उन तीनों को नजदीक बुलाया। तीनों दौड़ पड़े। बड़ा लड़का सब से आगे आने का प्रयत्न करने लगा। छोटे ने धक्का देना चाहा, पर स्वयं धक्के का शिकार हुआ और नाली में जा गिरा। बड़े ने इसी वक्त मिठाई ले लेनी चाही, पर छोटा झट उठकर आ खड़ा हुआ। आखिर दोनों ने मन ही मन समझौता कर लिया। एक कतार में दोनों दांत निकाले हाथ पसारे खड़े थे। बड़ा लड़का अपने पेट पर हाथ फेरकर अपने को विशेष दया का पात्र बनाने का प्रयत्न कर रहा था। लड़की दूर खड़ी जोर-जोर से दया की याचना कर रही थी। तिवारी जी चौंके। मैंने शीघ्र ही तीनों में बराबर बराबर अपनी बची हुई मिठाई का बंटवारा कर दिया।

तिवारी जी भी नाश्ता कर चुके थे। हांथमुंह धो मैं उन्हीं सबों के पीछे-पीछे चला। तिवारी जी सिगरेट का कश लगाते हुए हमारे पीछे-पीछे चले आ रहे थे। वह शहर में आकर दो-तीन सिगरेट अवश्य पी लिया करते थे, क्योंकि पत्नी के डर से घर में ऐसा सुअवसर प्राप्त होता ही न था।

चौड़ी और पतली सड़क की दाईं तरफ सकरी गली थी। गली के बाएं बगल एक दिवार थी और दाएं बगल टांगे खड़े होते थे। मोड़ पर एक सरकारी पेशाबखाना था। पेशाबखाने की दक्षिण और आखिरी दिवार से सटी हुई एक औरत कुछ फटे पुराने कपड़ों में लिपटी पड़ी थी। उसकी उम्र करीबन पचीस के होगी। चेहरे को गौर से देखने पर यह अंदाजा लगाना कठिन न था कि वह कभी गोरी भी थी। सिर के पीछे बंधे हुए बाल किसी पक्षी के घोंसले के समान लटक

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रहे थे। मुंह स्याह हो गया था और आखें लम्बी-लम्बी थीं। आंख और गाल के बीच वाली हड्डी ऊपर उठ आई थी। मुंह पर के छोटे-छोटे फोड़े हवा को दुर्गंधमय बना रहे थे। मक्खियां भी भिनक रही थीं। एक फटी और गंदी साड़ी से अपने शरीर को ढंके हुए वह सीधी लेटी थी मैं एकटांगे के पास खड़ा यह सब देख रहा था। तिवारी जी मेरे पागलपन पर तरस खा रहे थे और अपनी रेशमी रुमाल से नाक को अच्छी तरह ढके टांगा ठीक कर रहे थे।

वे तीनों पेशाबखाने के उत्तरी तरफ खड़े थे। लड़की चुपचाप अपने हिस्से की मिठाई लिए खड़ी थी और वे दोनों अपना-अपना हिस्सा जल्दी-जल्दी खा रहे थे। इसी बीच कोई बाबू उधर से गुजर जाता, तो चट अपने मुंह का भाव बदल लेते और एक स्वर से कहने लगते, "एक पैसा"। लड़की दस कदम आगे तक बढ़ जाती और विफल हो फिर लौट आती। जब वह किसी के पीछे जाती तब ये दोनों जैसे मन ही मन यह मनाने लगते कि उसे एक धेला भी न मिले और जब वह लौट आती तो ये खुश नजर आते।

इसी बीच किसी ने छोटे लड़के को एक पैसा दिया। जब वह कुछ आगे बढ़ गए, तो बड़े लड़के ने चट पैसा छीन लिया। छोटा लड़का मुंह देखता रह गया।

आखिर जब उन दोनो ने अपने-अपने हिस्से चट कर लिए तो तीनों उस औरत के पास पहुंचे। वह उनकी मॉं थी। उनको देखते ही वह कराहती हुई उठ बैठी, और आशा सूचक नेत्रों से पूछा "कुछ मिला ?" दोनो लड़कों ने हाथ हिला दिया। लड़की ने एक तरफ अपना हिस्सा रखते हुए कहा :—

"ये सब अपना-अपना हिस्सा खा गए। यह मेरा हिस्सा है, इसे मत खाना। मैंने अभी तक कुछ नहीं खाया है।"

उस औरत के चेहरे पर निराशा की रेखा अंकित हो गई और वह कराहते हुए फिर लेट गई। पर उसकी आंखे एक तरफ रखी मिठाई पर लगी रही।

लड़की चौराहे की तरफ चली गई। दोनों लड़के कुछ देर तक वहीं बैठे रहे।

बड़े लड़के ने एक अधजली बीड़ी निकाली। दोनों ने दो-दो कश लगाए।

छोटे लड़के ने पूछा :

"क्यों रे, यह कल वाली में से है क्या ?"

बड़े ने शंका समाधान किया—

"नहीं बे, आज उस पान वाले के यहां से हाथ लगी थी। बेटा गाली देते थे, खूब छकाया कोई सेठ सिगरेट खरीदने आया। वह जब अंदर सिगरेट लेने गया, तो मैंने चट चार बीड़ियों पर हाथ सफा कर दिया। वह भी बेटा क्या याद करेगा।"

अभी वे दोनों बीड़ी संबन्धी बातों में उलझे थे कि एक बाबू साहब मुंह में पान दबाये और आंखो पर चश्मा चढाए कुछ टेक-टेक कर चलते हुए उस गली में घुसने लगे। पान की पीक वह बहुत देर से मुंह में रखे थे, इसलिए गली में घुसते ही उन्होंने आगे की तरफ उसे थूक दिया।

भाग्यवश या दुर्भाग्यवश वह बड़े लड़के के मुंह पर पड़ी। वह अपनी आंख मलता हुआ चीख पड़ा, "अंधे हो"।

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उसी वक्त छोटे लड़के ने उठकर हाथ पसार दिया। बाबू साहब को अपनी गलती का आभास मिल चुका था। उन्होंने टेंट से एक पैसा निकाल उसे दे दिया। उस समय तक वह लड़का संभल चुका था। आगे बढ़ कर उसने कहा—

"पीक मुझपर पड़ी और पैसा उसे दे दिया। एक मुझे भी दो।"

बाबू साहब ने चलते हुए उसे भी एक पैसा दे दिया। दोनों ने चेहरे पर हर्ष की रेखा अंकित थी। वे दोनो मोड़ पर जा खड़े हुए।

इधर जब औरत को उन दोनों की अनुपस्थिति का आभास हुआ, तो वह उठ बैठी। मिठाई ज्यों-की-त्यों पड़ी थी। उसके मुख से लार टपकने लगी। भूख तेज हो गई। उसने दोनों को उठा लिया और मिठाइयों को एक ही बार में मुंह में ठूँस लिया। जल्दी-जल्दी दांतों से काम ले उसने दोने को कुछ दूर फेक दिया। और फिर लेट गई।

उसी वक्त लड़की आई। मिठाई के दोने की अनुपस्थिति ने उसे चंचल बना दिया। औरत को झझकोरती हुई वह पूछ बैठी।

"अरी माँ, मेरी मिठाई क्या हुई ?'

"मैं क्या जानूं ? कहीं कुत्ते तो नहीं ले गए ? जरा अच्छी तरह से ढूंढ तो।"

"अच्छी तरह से देख लिया कहीं नहीं है। अब क्या खाऊं ? ओ....ह।" लड़की रो पड़ी।

"अब क्या हो सकता है। तूने मुझे बतलाया भी तो नहीं था। जा. एक बार और घूम आ, शायद कहीं कुछ मिल जाय।"

दोनों लड़के लड़की का रोना सुन आचुके थे। बड़े लड़के ने अपनी माँ के मुंह का निरीक्षण. करना शुरू किया। यकायक वह हर्ष से चिल्ला पड़ा :

"अरी मुन्नी, इसने खाई है तेरी मिठाई। ये देख, ये दाने। हा.....हा.....हा।"

मुन्नी ने बिना कुछ पुछे उस निर्जीवप्राय औरत को दो-चार जोर की लात लगा दी। उधर दोनों लड़के हंस रहे थे और इधर मुन्नी भूखी-प्यासी चौराहे की तरफ दौड़ी चली जा रही थी।

औरत के आंखो में आंसू नाच रहे थे। ये आंसू मानसिक वेदना के नहीं, बल्कि शारीरिक पीड़ा के थे।

तिवारी जी इस आखिरी व्यापार को गौर से देख रहे थे।

"पाप का फैल भोग रही है। ये शहर के कुत्ते हैं।" लंबी सांस खीचते हुए उन्होंने अपना आखिरी फैसला भी दे डाला।

हम लोग टांगे पर बैठ गए और टांगा पहले धीरे-धीरे, फिर तेज रफ्तारसे चलने लगा। तिवारी जी खर्चे का हिसाब लगा रहे थे, पर मैं मन-ही-मन उन शहर के कुत्तों के जीवन का मूल्य आंक रहा था।

(सरिता से उद्धृत)

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स्वप्न—एक मनोवैज्ञानिक विश्लेषण

—मोहनलाल मेहता बी० ए०, शास्त्री, (दर्शनविभाग, का० हि० वि० वि०)

मानवजाति के लिए स्वप्न एक रोचक विषय रहा है। प्राचीनकाल से लगा कर वर्तमान काल के वैज्ञानिक युग तक इस विषय पर विचारकों ने अनेक प्रकार के ग्रन्थ लिखे हैं। आज के मनोविज्ञान में तो स्वप्न अध्ययन का एक अलग विषय ही बन गया है। प्राचीनकाल के विचारक स्वप्न को भविष्य का सूचक समझते थे। वे स्वप्न का विवेचन इसी आधार पर करते थे कि भविष्य में क्या घटना होने वाली है। अथवा यों कहिए कि उन लोगों की दृष्टि में स्वप्न एक भविष्यवक्ता का कार्य करता था। किसी महापुरुष की माता को क्या-क्या स्वप्न आ सकते हैं, इत्यादि बातों पर अनेक ग्रंथ लिखे गए हैं। राजा अमुक स्वप्न देखे तो देश पर कौन-सी विपत्ति आ सकती है अथवा अमुक स्वप्न के अनुसार देश का क्या हित होने वाला है—इत्यादि विषयों पर दुनिया की लगभग सभी परम्पराओं में सामग्री उपलब्ध होती है।

आज स्वप्न का क्षेत्र बिलकुल ही बदल गया है। आज का स्वप्नशास्त्री स्वप्न को भविष्य का सूचक न मान कर उससे कुछ अतीत का निर्देशक मानता है। स्वप्न के इस सिद्धान्त की प्रतिष्ठा करने वालों में से सिगमुंड फ्रायड प्रमुख है। फ्रायड के अनुसार स्वप्न अतीत की कुछ घटनाओं के प्रतीक हैं। हमारी दबी हुई इच्छाएं (Repressed wishes) जब अचेतन मन के भीतर रह कर भी शान्त नहीं रह सकती तब वे अपना रूप स्वप्न में आकर प्रगट करती हैं। इस प्रकार की दबी हुई इच्छाएं बहुधा बाल्यकाल के जीवन से सम्बद्ध होती हैं। सामाजिक, धार्मिक एवं आर्थिक बाधाओं के कारण जब बालक अपनी इच्छाओं को सन्तुष्ट नहीं कर सकता, उस समय वे बाधाप्राप्त इच्छाएं दबी हुई दशा में अचेतन अवस्था में पड़ी रह जाती हैं। माता पिता यह समझते हैं कि हमने बालक की इच्छाओं पर विजय प्राप्त कर ली है। उसकी वास्तव में ऐसा समझने वाले माता पिता बड़ी भारी भूल करते हैं। जिस प्रकार कोई भी सरकार किसी राजनैतिक दल को सर्वथा कुचल नहीं सकती, हां, कुछ समय के लिए उसे दबा अवश्य सकती है उसी प्रकार बालक के माता पिता बालक की किसी भी इच्छा को, चाहे वह उनकी दृष्टि में कितनी ही बुरी क्यों न हो, कुचल नहीं सकते—उसको हमेशा के लिए नष्ट नहीं कर सकते। कुछ समय के लिए उसे दबा कर वे समझ लेते हैं कि हमने विजय प्राप्त कर ली। मानव को अधिकांश मानसिक रोग और कुछ शारिरीक रोग भी मातापिताओं की इसी गलती के कारण होते हैं। विशेष कर काम सम्बन्धी रोगों (disorders sexual) का मूल तो यही है। फ्रायड के अनुसार स्वप्न की एक ही वाक्य में व्याख्या करें तो 'स्वप्न बाल्यकाल की पीड़ित कामेच्छाओं की पूर्ति का प्रतीकात्मक साधन है।" जो काम चेष्टाएं सामाजिक प्रतिबन्धों के कारण पूरि नहीं हो पातीं वे स्वप्न में पूरी होती हैं। यहां 'काम' शब्द का संकुचित अर्थ न होकर एक विशाल अर्थ है जिसमें पांचों इन्द्रियों के विषयों का समावेश है।

एडलर स्वप्न को भूतकालीन इच्छाओं का प्रतीक न मान कर वर्तमानकालीन समस्याओं का प्रतीक समझता है। वह कहता है कि हमारी जो समस्याएं जाग्रतावस्था में हल नहीं हो

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सकती वे समस्याएं स्वप्नावस्था में सुलझती हैं या पूरी होती हैं। युग की मान्यतानुसार स्वप्न अतीत के जीवन का अनुभव है। जिन बातों का हमने अतीत में अनुभव किया है वे ही बातें यथा समय स्वप्न में आती रहती हैं। युग की दृष्टि में स्वप्न अतीत के अनुभव की नकल मात्र है। वह यह आवश्यक नहीं समझता कि दबी हुई काम चेष्टाएं ही स्वप्न में पूरी हों। कोई भी अतीत का अनुभव स्वप्न में प्रतिभासित हो सकता है। दूसरे शब्दों में कहा जाय तो स्वप्न एक स्मृति है जिसका अनुभव जाग्रतावस्था में न होकर निद्रावस्था में होता है। जुंग यह भी मानता है कि स्वप्न अतीत की स्मृति होते हुए जीवन की कई समस्याओं का हल भी करते हैं। कई ऐसी उलझी हुई समस्याएं, जिनका हल जाग्रतावस्था में नहीं हो सकता है, स्वप्नावस्था में जाकर सुलझ जाती हैं। उदाहरण के तौर पर एक विद्यार्थी गणित की एक समस्या सुलझाता-सुलझात सो जाता है। ऐसी अवस्था में कई बार ऐसा भी देखा जाता है कि वह विद्यार्थी स्वप्न देखते-देखते ही उठकर उसका उत्तर लिख देता है और वापिस सो जाता है। प्रातःकाल जब वह उठता है तो अपनी उत्तरपुस्तिका में इस प्रकार का उत्तर देखकर चकित हो जाता है। उसे यह मान ही नहीं रहता कि यह घटना कैसे घटी। एडलर और जुंग की मान्यताओं में यही अन्तर है कि एडलर स्वप्न को केवल वर्तमान अवस्था का सूचक समझता है जब कि जुंग की मान्यता के अनुसार स्वप्न भूत और वर्तमान दोनों का सूचक हो सकता है। फ्रायड से इन दोनों का मतभेद यही है कि फ्रायड स्वप्न को केवल कामेच्छापूर्ति का साधन मनाहै जब कि एडलर और जुंग सभी इच्छाओं का स्वप्न में समावेश करते हैं।

डेलेग की धारणानुसार स्वप्न वह अवस्था है जहां हमारे जीवन के असामञ्जस्य (unadjustment) की पूर्ति होती है अर्थात् जिन समस्याओं का हमलोग जाग्रतावस्था में सामञ्जस्य स्थापित नहीं कर सकते वे समस्याएं स्वप्नावस्था में जाकर इस कमी को पूरी करती हैं। रिवर्स की मान्यतानुसार स्वप्न मानसिक द्वन्द्व (mental conflict) का प्रतीक है। हमारी मानसिक उलझनें ही स्वप्न का रूप धारण करती हैं। जिस व्यक्ति का मस्तिष्क अनेक उलझनों से भरा रहता है वही व्यक्ति अधिक स्वप्न देखता है। जो व्यक्ति बलिकुल निश्चिन्त होता है उसे स्वप्न नहीं आया करते।

इन सब मान्यताओं का अध्ययन करने से यह स्पष्ट हो जाता है कि स्वप्न इच्छापूर्ति (wish fulfilment) मात्र है। स्वप्न ऐसी इच्छाओं का प्रतीक है जो किसी न किसी रूप में दबा दी गई हैं अथवा पूर्णरूप से पूरी न हो सकी हैं। हमारी कुछ इच्छाएं ऐसी होती हैं जिन्हें हम पूरी करना चाहते हैं किन्तु समाज के भय से अथवा अपनी खुद की कमजोरी से या परिस्थिति के डर से वे पूरी नहीं हो पातीं। ऐसी इच्छाएं स्वप्न में पूरी होती हैं और कभी कभी तो ये इच्छाएं इतनी बलवान् होती हैं कि अपनी अतृप्ति से असन्तुस्ट होकर या क्रुद्ध होकर अनेक प्रकार की मानसिक बीमारियों (Neuroses) का पैदा कर देती हैं। दबी हुई इच्छाएं बहुधा स्वप्न से ही सन्तुष्ट हो जाती हैं। ऐसी अवस्था में यह स्वाभाविक है कि स्वप्न में हमारा सैद्धान्तिक अहंभाव समाप्त हो जाता है। हमारे सारे आदर्श मिट्टी में मिल जाते हैं। स्वप्न में कुछ नियन्त्रण अवश्य रहता है किन्तु वह नियंत्रण चिरस्थायी नहीं होता। इसीलिए स्वप्न-शास्त्री यह कहते हैं कि भला आदमी जिस चीज का स्वप्न देखता है, बुरा आदमी उसी चीज को

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जाग्रतावस्था में कर डालता है। (Good man dreams what bad man does.)

स्वप्न अपने विचारों के अनुसार संसार को देखने का एक अच्छा उदाहरण है। स्वप्न-दृष्टा, जहां वाह्य वस्तु का सर्वाथा अभाव होता है वहीं न जाने किन २ पदार्थों का निर्माण कर लेता है। सोते समय वह एकाकी होता है किन्तु स्वप्न में उसकी वही कमरा न जानेसंसार की कौनसी वस्तुओं से भर जाता है। उसका एकाकी जीवन अपनी ही धारणाओं के अनुसार किस प्रकार लहराने लगता है। वह संसार के पदार्थों का निर्माण अपनी धारणा के अनुसार करता है। वह सांसारिक सभी वस्तुओं का निर्णय अपनी विचारधारा के अनुसार करता है। वह सारे संसार को अपने विचारों के अनुसार देखता है। इस प्रकार की दृष्टि को मनोविज्ञान की भाषा में प्रोजेक्शन (Projection) कहते हैं। क़ाव्य का आधार भी स्वप्नके समान ही दबी हुई इच्छाएं हैं। कवि जिन इच्छाओं की अभिव्यक्ति साधारण भाषा में नहीं कर सकता उन्हीं की अभिव्यक्ति अलंकारमय भाषा में करता है। विशेषकर श्रृंगाररस के कवियों की भूमिका तो यही है।

स्वप्न क्या है व उसकी उत्पत्ति का आधार क्याहै—इत्यादि बातें जान लेने के बाद अब हम स्वप्न की विशेष अवस्थाओं की ओर पहुंचते हैं। स्वप्न में हम जिस प्रकार के वार्त्तालाप व व्यवहार का अनुभव करते हैं वह सब वास्तव में एक नाटकीय दृश्य होता है। दूसरे शब्दों में कहा जाय तो वह सिनेमा का एक शो होना है। हमारे अर्धचेतन मनोपट पर एक के बाद एक चित्र आता रहता है। ये चित्र हमारी दबी हुई इच्छाओं के प्रतीक होते हैं। स्वप्न की सारी सामग्री चित्रों के रूप में ही रहता है। एक दूसरे से वार्तालाप, पारस्परिक प्रेम, किसी प्रकार का भय, हास्य और रुदन, प्रसन्नता और खेद—आदि सभी प्रकार के मन में भाव चित्र के रूप में ही रहते हैं। दृश्य और अदृश्य सभी प्रकार की सामग्री चित्रों के रूप में ही सामने आती है। जो सुना जाता है उसका भी चित्र होता है और जिसका अनुभव किया जाता है वह भी चित्र के रूप में होता है। तात्पर्य यह है कि स्वप्न का संसार चित्रमय होता है। मनोविज्ञानवेत्ता इसे (Dramatisation तथा Visualisation) कहते हैं।

स्वप्न में प्रतीकवाद का (Symbolism) का महत्वपूर्ण स्थान है। हमारे अधिकांश स्वप्न प्रतीक के रूप में होते हैं। प्रतीकवाद का अर्थ यह है कि जो इच्छा जिस रूप में व्यक्त होनी चाहिये वह उस रूप में प्रगट न होकर किसी अन्य रूप में हमारे सामने आती है। उदाहरण के तौर पर एक व्यक्ति अपने मन में तरह तरह की ऊंची ऊंची कल्पनाएं करता है। वह सोचता है कि मैं पढं कर अमुक उन्नत स्थान पर पहुंच जाऊंगा। अमुक विचारधारा का प्रतिपादन करके अमुक प्रकार का नेता बन जाऊंगा—इत्यादि ढंग से बड़े-बड़े संकल्प-विकल्प करता है किन्तु बहुत प्रयत्न करने पर भी वैसा करने में सफल नहीं हो पाता। परिणामतः उसकी सारी कामनाएं चेतना के क्षेत्र से हटकर अचेतन मस्तिष्क में पहुंच जाती हैं। वहां से फिर वे स्वप्न के रूप में ध्येय तक पहुंचती हैं किन्तु उनकी पहुंच ठीक उसी रूप में न होकर एक अन्य रूप में होती है। वह व्यक्ति एक स्वप्न देखता है जिसमें अपने आप को आकाश में उड़ता हुआ पाता है। एक क्षण में वह आकाश के एक किनारे से दूसरे किनारे तक पहुंच जाता है और अपनी अद्भुत शक्ति पर गर्व

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करता है। यह प्रतिकवाद का एक दृष्टान्त है। यहां पर उस व्यक्ति का आकाश में उड़ना यह प्रामाणित करता है कि उसके मन में बड़ी बड़ी अभिलाषाएं एवं कल्पनाएं हैं किन्तु परिस्थिति की प्रतिकूलता के कारण वे ऊंची ऊंची अभिलाषाएं पूरी नहीं हो पाई हैं। यहां पर 'उड़ैना' ऊची अभिलाषाओं का प्रतिक है। इसीलिए इस प्रकार के स्वप्म को हम प्रतीकवाद की कोटि में रखते हैं। इसी प्रकरा से जब भय अन्यरूपमें प्रगटहोता है उस समय व्यक्ति सर्प ,सिंह इत्यादि प्रतीकों के रूप में स्वप्न देखता है। इन प्रतीकों का आधार हमारे जीवन की पद्धति है। हम जिस प्रकार के समाज में अपना जीवन व्यतीत करते हैं उसी प्रकार के हमारे प्रतीक होते हैं। प्रतीकवाद के निर्माण में हमारी धार्मिक एवं नैतिक मान्यताओं का बहुत बड़ा हाथ होता है।

कई बार हम ऐसे स्वप्न भी देखते हैं जिनमें कुछ विचित्र सी चीजें दिखाई पड़ती हैं। उदाहरण के लिए हमने अपने स्वप्न में एक ऐसा पशु देखा जिसका मुंह तो शेर का है और शरीर गाय का है। इस स्वप्न का क्या अर्थ हुआ ? इसका विवेचना करने पर मालूम होगा कि यह स्वप्न है तो प्रतीक के रूप में किन्तु यह प्रतीक ऐसा है जो दो प्रकार की भावनाओं का प्रतीनिधित्व करता है। शेरका मुंह हमारी हिंसक वृत्ति का प्रतीक है जब कि गाय का शरीर हमारी करुणा वृत्ति को प्रगट करता है। इस प्रकार का स्वप्न हमारे मानसिक द्वन्ठ का प्रतीक होता है। कभी-कभी व्यक्ति के जीवन में दोहरी वृत्ति कार्य करती है। ऐसी वृत्ति वाला व्यक्ति एक भावना से तो किसी का नाश चाहता है ,किन्तु साथ ही में उसे दया भी आ जाती है और इन दोनों भावनाओं में से एक का चुपचाप नहीं कर सकता। इस प्रकार की मानसिक संघर्ष की दशा ही ऐसे विचित्र स्वप्न पैदा करती है।

इस प्रकार से हम इस निर्णय पर पहुंचते हैं कि स्वप्न में दो प्रकार की सामग्री रहती है। एक सामग्री वह होती है जो स्पष्ट रूप से हमारे सामने रहती है। दूसरी सामग्री स्पष्ट न होकर किसी न किसी प्रतीक के रूप में रहती है। प्रथम प्रकार की सामग्री को Manifest content कहते हैं और दूसरी प्रकार की सामग्री को Latent content। मनोविश्लेषण (Psycho-anaeysis) के लिए इन दोनों प्रकार की सामग्रियों का सभ्याज्ञान आवश्यक है।

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'संस्कृति की समस्या'

सतीश चन्द्र चतुर्वेदी (तृतीय वर्ष कला)

सभ्यता और संस्कृति को बहुधा समानार्थक समझा जाता है; यद्यपि इन दोनों से जो अर्थ सूचित होते हैं वे परस्पर संबद्ध हैं फिर भी वे एक नहीं हैं। हमारी संस्कृति वह है जो कुछ हम हैं; जबकि सभ्यता वह है जो कुछ हम प्रयोग करते हैं। सभ्यता मनुष्य के प्रकृति पर किए जाने वाले नियंत्रणग को कह सकते है, इसमें प्रकृति नियंत्रण के यंत्र (वायुयान, रेलगाड़ी, और टेलीफोन आदि), और मनुष्य की आर्थिक, सामाजिक एवं राजनीतिक प्रणालियां आती है। संस्कृति का अर्थ है मनुष्य का मस्तिष्क पर नियंत्रण, यह मस्तिष्क और इच्छा का प्रतिनिधित्व है जो व्यक्तिगत और सामाजिक सद्व्यवहार द्वारा प्रदर्शित होता है।

सभ्यता और संस्कृति के कुछ स्पष्ट विभेद हैं। प्रथमतः संस्कृति-आंतरिक और अध्यात्मिक होती है, सभ्यता वाह्य और सांसारिक होती है। दूसरे संस्कृति व्यक्तिगत होती है जब कि सभ्यता सामाजिक और संयुक्त होती है, जबकि संस्कृति व्यक्तिगत होने से अधिक विकसित या अविकसित दोनो ही रूप में रह सकती है। चतुर्थ सभ्यता को सरलता से स्थानान्तरित, परिवर्तित और मिश्रित किया जा सकता है इसलिए ही विश्व में एक सभ्यता का निर्माण सरल है जबकि संस्कृति में वर्गगत और व्यक्तिगत विभिन्नताएं पायी जाती हैं।

इन विभिन्नताओं के होते हुऐ भी सभ्यता और संस्कृति एक दूसरे से दूर नहीं है। वे आपस में सम्बन्धित है; संस्कृति से मानसिक जागरण और उत्साह की वृद्धि होती है, सभ्यता भौतिक शक्ति प्रदान करती है। मनुष्य जाति को शक्ति एवं समृद्धि के लिए दोनों के श्रेष्ठ मिश्रण की आवश्यकता है एक विशेष संस्कृति, एक विशेष सभ्यता को जन्म देती है और यह नई सभ्यता अपने लिए नई संस्कृति की मांग करती है; जब संस्कृति नवीन और नवीनतर सभ्यता की जन्म नही देती वह निर्जीव हो जाती है—और जब वह एक नई सभ्यता को जन्म देने के बाद अपने आपको उसके अनुरूप नही ढालती तो मानवता विपदग्रस्त हो जाती है। इसलिए दोनो को साथ साथ बढ़कर ,अपने को एक दूसरे के अनुरूप ढालते हुए वृद्धि पथपर अग्रसर होना चाहिए।

पिछले दो हजार वर्षों में मस्तिष्क के सिद्धान्तों की प्रगति भौतिक समृद्धि की अपेक्षा नगण्य रही है, उदाहरणार्थ यदि अरस्तू आज के एक मनोविज्ञानिक से बात करे तो अपने को उसके बहुत समीप पाएगा, जबकि एक भौतिक शास्त्री वह अपने को कोसों पूर पाएगा। इसी से हमारा ज्ञान, हमारी इच्छा को पार कर गया है; आज के वैज्ञानिक अनुसंधानो के पीछे दयाहीन प्रवृतियां कार्य करती हैं इसलिए ही विज्ञान-जैसे सर्वश्रेष्ठ दास का दुरुपयोग किया जाता है। संक्षेप में हमारी नैतिक प्रगति, भौतिक प्रगति का साथ नही दे रही है; हमारी संस्कृति-सभ्यता से पिछड़ रही है। यही व्यवधान हमारे युग की सब समस्याओं के मूल मे हैं और इसीलिए यही हमारी सबसे बड़ी युगसमस्या है।

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एतदर्थ आज युग की मांग है कि सभ्यता और संस्कृति के सुसम्बन्ध स्थापित करने के लिए (जो मानवता की शान्ति और विकास के लिए आवश्यक है) संस्कृति के विकास पर अधिक जोर दिया जाय। विज्ञान ने विश्व में एक सभ्यता का निर्माण किया है और वर्तमान सभ्यता एक नई विश्वसंस्कृति की मांग करती है।

वास्तव में सच्ची सांस्कृतिक परम्पराएं तो आज एक होने को ही बाध्य होगी, वे किसी वर्ग, व्यक्ति या भूखण्ड की छाप लेकर नही चल सकती। कोई भी संकुचित विचारधारा आज सच्ची संस्कृति के विकास में सहयोग नही दे सकती; क्योंकि संकुचित विचारधाराएं विरोधी होंगी और या विरोध स्वयं मे संस्कृतिहीनता का परिणाम है। फिर एक वर्ग, जाति या राष्ट्र के सांस्कृतिक अतीत की स्वर्णिम कथा उसे ऐतिहासिक सत्यों के प्रति आंखें वन्द करने को प्रलुब्ध करती हैं और सचमुच के स्वर्णिम भविष्य के रास्ते में बाधा वन जाती है। सारे संसार से अपने को—सांस्कृतिक सुदृढता या झूठे सांस्कृतिक उच्चता के घमन्ड पर—दूर करने वाले निश्चय ही संसार में पिछड़ जाएंगे। वह संस्कृति जो हमें और मनुष्यों से दूर ले जाय सच्ची संस्कृति नही है; आज हमें 'मानवी' संस्कृति की आवश्यकता है—जो सारे मनुष्य, समाज पर, देश जाति रंग, धर्म, लिंग और संप्रदाय के भेदों के रहते हुए भी समान रूप से लागू हो।

हम पूर्वी और पश्चिमी, हिन्दू और मुस्लिम संस्कृति की बाते करते है सिर्फ यह बताने के लिए कि एक समाज या देश ने ऐतिहासिक अलग-अलग परिस्थितियों, सामाजिक दशाओं और प्रतिबन्धों के बीच हो कर सांस्कृतिक विकास के किस स्तर को प्राप्त किया है। सांस्कृतिक विभिन्नताएं इसलिए विकास के क्रम के स्तर मानी जानी चाहिए। किसी व्यक्ति या समाज की संस्कृति स्थिर नही होती, वरन् सतत विकसित होती रहती है इसी लिये एक समाज विशेष की अपनी अलग एक संस्कृति होते हुए भी उसके भी कई स्तर होते है। इस प्रकार एक व्यक्ति या समाज का विभिन्न परिस्थितियों के कारण उच्च या निम्न सांस्कृतिक स्तर हो सकता है।

राष्ट्रीय राज्यों की तरह विभिन्न भूखण्डों में आपनी मेलमिलाप के साधनो की कमी के कारण विभिन्न संस्कृतियों का जन्म हुआ। परन्तु आज विज्ञान की प्रगति के कारण विश्व एकता के भावके चारों ओर 'विश्व संस्कृति' जन्म ले रही है।

इस एकता के लिऐ हमें भी कुछ करना है। दो आवश्यक बाते है :—प्रथम हम विभिन्न संस्कृतियों को पहचानें और ईर्षा-रहित हो उनको अपने हृदय में स्थान दें; दूसरे इन सांस्कृतिक भेदों को कम से कम करते हुऐ एक संस्कृति बनाने की चेष्टा में निमग्न हों। यह तो सम्भव नही कि लोग अपने महत्वपूर्ण सांस्कृतिक भेदों को भुला दें, परन्तु एक दूसरे को निर्मल हृदय से समझने की, आदर करने की, सहयोग और प्रेम करने की चेष्टा तो कर ही सकते है।

इस बात के लिये आवश्यक है कि सब प्रकार के अन्तरजातीय और अन्तरराष्ट्रीय संवंधों को आध्मातिक-घनिष्ठ बनाया जाय।

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REVIEWS

Hindu Samskāras: A Socio-Religious Study of the Hindu Sacraments: By Dr. Raj Bali Pandey, M.A., D.Litt., Professor of Ancient Indian and Culture, Banaras Hindu University; published by Vikrama Publications, Bhadaini, Banaras, pp. XXVIII+546.

The book under review, gives an account of the Smārta Samskāras, which constitute an important aspect of Hindu Culture. Their origin may be traced to hoary antiquity, and they seek to influence and refine the life of a Hindu from its inception in the mother's womb to death and even beyond it through the cult of the soul. These ceremonies and symbolic performances were based on the prevalent religious beliefs and social conditions, and they gave expression to the ideals and aspirations of the Hindus. Indeed, they provide a key to the understanding of the life of a Hindu in its social and religious setting. The study of these sacraments, some of which have now gone out of vogue, is thus a subject of absorbing interest, and we are happy that Dr. Pandey has done it in a worthy manner.

The work has been divided into ten chapters. The first deals with the sources in their chronological order bringing out their relative importance in the reconstruction of the history of the Samskāras. The second discusses the meaning and number of the Samskāras. Here the peculiar meaning of the Samskāras has been explained and their scope and number fixed. The third chapter throws light on their purpose, giving a clear analysis of the popular, superstitious, material, moral and spiritual significance underlying them. The fourth has for its theme the constituents of the Samskāras. It classifies and interprets the various elements and factors, which constitute them. Chapters V-XI deal with the origin, development and significance of the classical sixteen Samskāras from Garbhādhāna (conception) to Antyeṣṭhi (funeral). The tenth and the concluding chapter gives a retrospect and prospects of the Samskāras from the sociological and psychological points of view.

The author deserves to be warmly congratulated on the excellent work that he has produced. His treatment of the subject is lucid and critical, and is based upon his extensive knowledge of, and insight into, the ancient social and religious institutions of India and the original texts bearing on them. He has collected almost all the available data, and drawn from them cautious conclusions. It is really noteworthy that the author has not indulged in speculative and mystic interpretations of the various symbols, rites, ceremonies and social customs. He has throughout given profuse quotations and references, which make it easy for the reader to check and verify his statements and generalisations. It would, however, be well if in the next edition the proofs are more carefully corrected so as to avoid clumsy typographical mistakes. One may also not agree with the approach of the author on certain points, but these do not in any way detract from the intrinsic merit of the work. It is an original and substantial contribution towards the re-construction of the history of an interesting aspect of Hindu culture, and I have no doubt that students and scholars alike will find the book useful and instructive.

R. S. Tripathi

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